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**BISCAYNE NATIONAL PARK**  
**FIRE MANAGEMENT PLAN**  
*(MIAMI, KEY BISCAYNE, & HOMESTEAD, FLORIDA)*

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**ENVIRONMENTAL ASSESSMENT**  
**OCTOBER 2004**

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# Biscayne National Park

## *Fire Management Plan – Draft Environmental Assessment*

### **National Park Service**

U.S. Department of the Interior

### **Biscayne National Park**

9700 SW 328 Street

Homestead, FL 33033-5634

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**Compilation Date: October 2004**

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## United States Department of the Interior

**NATIONAL PARK SERVICE**  
**Biscayne National Park**  
**9700 SW 328<sup>th</sup> Street**  
**Homestead, Florida 33033-5634**

IN REPLY REFER TO:

**OCT 08 2004**

Y1450

Dear Interested Party:

Enclosed is a copy of the **Biscayne National Park Fire Management Plan Environmental Assessment** for your comment and review. This environmental assessment was prepared pursuant to the National Environmental Policy Act (NEPA). Our records indicate that you have participated in the planning process or have requested to receive copies of the park's planning documents.

National Park Service Wildland Fire Management Guidelines (DO-18) mandates, "All parks with vegetation that can sustain fire must have a fire management plan." The purpose of this federal action is to develop a fire management plan and program that utilizes the benefits of fire to achieve desired natural and cultural resource conditions while minimizing the fire danger to park resources and adjacent lands from hazardous fuel accumulations.

Based on the analysis, I consider Alternative 2 to be the Park's preferred alternative for best accomplishing the purpose and need for this Proposed Action. Under this alternative, fire management activities would protect park resources and adjacent lands from the threat of wildland fires. This alternative also best protects and helps preserve the historic, cultural, and natural resources in the park for current and future generations.

Additional information concerning the Biscayne National Park Fire Management Plan can be obtained from:

Linda Canzanelli, Superintendent  
Biscayne National Park  
9700 SW 328 Street  
Homestead, FL 33033-5634

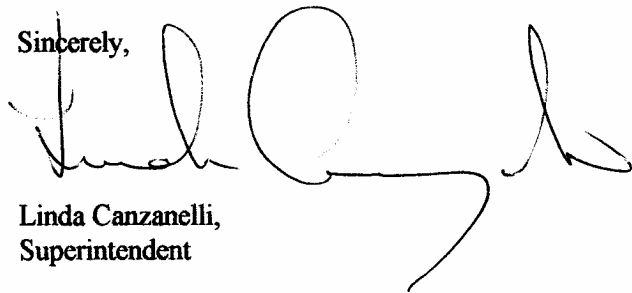
Written comments will be accepted until November 8, 2004, 30 days after the publication of the environmental assessment Notice of Availability in the Miami Herald, which will be on or about October 8, 2004. Please include the following information when submitting comments:

1. Name, address, and (if possible) telephone number;
2. Title of the document on which the comments are being submitted; and,
3. Specific facts of comments, along with the supporting reason, that the Superintendent should consider in reaching a final decision.

Comments received in response to this solicitation, including names and addresses, will be part of the public record and available for public inspection.

Comments on this environmental assessment can be provided by e-mail ([linda\\_canzanelli@nps.gov](mailto:linda_canzanelli@nps.gov)), fax: (305)-230-1190, phone:(305)- 230-7275, or mail to Linda Canzanelli, Superintendent, Biscayne National Park, 9700 SW 328 Street, Homestead, FL 33033-5634.

Sincerely,

A handwritten signature in black ink, appearing to read 'Linda Canzanelli', with a large, stylized loop in the middle.

Linda Canzanelli,  
Superintendent

Enclosure

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# Chapter 1 - Purpose and Need

## 1.1 INTRODUCTION

This Environmental Assessment (EA) documents the potential environmental impacts from actions proposed in the Biscayne National Park Fire Management Plan.

This EA has been prepared in compliance with:

- The National Environmental Policy Act (NEPA) of 1969 (42 United States Code (USC) 4321 et seq.), which requires an environmental analysis for major Federal Actions having the potential to impact the quality of the environment;
- Council of Environmental Quality Regulations at 40 Code of Federal Regulations (CFR) 1500-1508, which implement the requirements of NEPA;
- National Park Service Conservation Planning, Environmental Impact Analysis, and Decision Making; Director's Order (DO) #12 and Handbook.

### *The Purpose of an Environmental Assessment (EA)*

There are three primary purposes of an EA:

- To help determine whether the impact of a proposed action or alternative could be significant, thus indicating that an environmental impact statement (EIS) is needed;
- To aid in compliance with NEPA when no EIS is necessary by evaluating a proposal that will have no significant impacts, but that may have measurable adverse impacts; and
- To facilitate preparation of an EIS if one is necessary.

Key goals of NEPA are to help Federal agency officials make well-informed decisions about agency actions and to provide a role for the general public in the decision-making process. The study and documentation mechanisms associated with NEPA seek to provide decision-makers with sound knowledge of the comparative environmental consequences of the several courses of action available to them. NEPA documents, such as this EA, focus on providing relevant information to assist the agency in making appropriate decisions. In this case, the Superintendent of Biscayne National Park is faced with a decision to establish the Park's Fire Management Plan as described below. This decision will be made within the overall management framework already established in the 1983 Biscayne National Park General Management Plan (GMP) and 1995 Resource Management Plan and is consistent with 2001 Federal wildland fire management policy and guidelines (the park is currently in the planning phase for an updated GMP). The alternative courses of action to be considered at this time are, unless otherwise noted, crafted to be consistent with the concepts established in the 1983 General Management Plan (The Fire Management Plan will be revised as appropriate to incorporate any new management direction provided by the updated GMP), and the 2001 Federal wildland fire management policy and guidelines.

In making decisions about National Park Service (NPS) administered resources, the NPS is guided by the requirements of the 1916 Organic Act and other laws, such as the Clean Air Act, Clean Water Act, and Endangered Species Act. The authority for the conservation and



management of the National Park Service is clearly stated in the Organic Act, which states the agency's purpose: "...to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." This authority was further clarified in the National Parks and Recreation Act of 1978: "Congress declares that...these areas, though distinct in character, are united...into one national park system.... The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress."

The requirements placed on the NPS by these laws, especially the Organic Act mandate that resources are passed on to future generations "unimpaired" (DOI, 2001a). An impairment is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values, including opportunities that otherwise would be present for the enjoyment of those resources or values. An impact would be less likely to constitute an impairment to the extent that it is an unavoidable result from an action necessary to preserve or restore the integrity of park resources or values (DOI, 2001b). This EA addresses whether the actions of the various alternatives proposed by Biscayne National Park impair resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park's general management plan or other NPS planning documents (see *Chapter 3 – Environmental Consequences*).

## 1.2 PURPOSE AND NEED

National Park Service (NPS) policy (*Director's Order #18: Wildland Fire Management*) requires that every park unit with burnable vegetation develop a fire management plan (FMP) approved by the park superintendent. The FMP serves as a detailed and comprehensive program of action to implement fire management policy principles and goals, consistent with the unit's resource management objectives. The park's fire management program, guided by Federal policy and the park's resource management objectives, will serve to protect life, property, and natural and cultural resources.

The Fire Management Plan pertains specifically to the terrestrial portions of the park, including the mainland/Convoy Point, and the 42 islands/keys within park boundaries. The islands throughout Florida Bay in the Everglades or most of the Florida Keys are not fire-maintained ecosystems (the only exception in the Florida Keys are those islands, such as Big Pine Key, located far to the south and west of park, with areas of pine rocklands on them where fire does play a role). According to Bob Panko, Fire Management Officer at Everglades National Park, there have been no recorded fires in 60 years on any of the islands throughout Florida Bay, despite a large amount of lightning activity (Panko, 2003).

There is little information in the historic record pertaining to past fire occurrence or fire use within present park boundaries. The report entitled *Biscayne National Park Historic Resource Study* (Leynes and Cullison 1998) does note that,

...the keys did not offer a great deal of arable land to the early settlers, and much of that was covered with hardwood hammocks. Early visitors to the area valued these clusters of mature hardwoods for their mahogany. Later settlers generally saw the hammocks as worthless, and the “almost universal custom” was to clear the “scrubby woods” to plant fields or groves. The preferred method of clearance was burning.

Since Biscayne National Park entered National Park Service administration in 1968, all wildland fire within its boundaries has been suppressed. The annual occurrence of wildland fires at the park is very low; since 1977, only eight documented wildland fires have occurred within park boundaries, burning a total of two acres. These fires have been restricted to previously disturbed sites, with landscape features and exotic vegetation.

## 1.3 BACKGROUND

Biscayne National Park contains 172,924 gross acres. Biscayne National Monument was established in 1968 by the 90th Congress through the enactment of Public Law 90-606. The Monument was expanded in 1974, PL 93-477, and again in 1980, PL 96—237, when it was redesignated Biscayne National Park.

It is located to the south of the City of Miami, in Dade County, Florida. The park is about 22 miles long, with its northern boundary near Key Biscayne and its southern boundary near Key Largo. The park’s western boundary is roughly defined by the landward extent of a mature red mangrove forest that forms a narrow band, 100-2,000 feet wide, along the western shoreline of Biscayne Bay. The park’s eastern boundary follows the 60-foot-depth contour, for an approximate width of 14 miles. Biscayne is primarily a marine park, with 95 percent of its area submerged within either the shallow Biscayne Bay or the more turbulent waters of the Hawk Channel and the Florida Straits.

The terrestrial portion of the park, totaling 9,075 acres, includes 4,825 acres of largely undeveloped mangrove shoreline on the park mainland, and 4,250 acres scattered across 42 islands/keys. The only overland access to the park is at the Convoy Point Visitor Center via Southwest 328<sup>th</sup> Street (North Canal Drive). Primary park developments are found at three locations: the Convoy Point administrative headquarters, Elliott Key Harbor complex, and Adams Key.

Three of the six keys (Adams, Boca Chita, and Elliott) have NPS structures are very popular visitor use areas. The keys range in size from just under 2 to over 2,000 acres. There are two islands north of Boca Chita Key that are still in private ownership and one of these, Ragged Key #3, has a resident caretaker. The remaining 171,925 acres is submerged and nearly equally divided in aerial extent between the reef tract and estuarine environments.

In general, the park can be divided into three major environments: coral reef, the bay environment (Biscayne Bay), and terrestrial. The coral reef tract, commonly referred to as the reef platform, lies due east of the keys and comprises the northernmost extension of living coral reefs in the United States. A west to east profile across the reef tract reveals two major zones: the back reef and outer reef (or fore reef). Intermittent patch reefs, sea grass beds, and sand lenses make up an irregular pattern of shallow banks and relatively deeper channels within the back reef zone. The outer reef forms the seaward edge of the reef platform, and usually consists of a series of terraces that increase in depth to the east.

The estuarine system of the park comprises the southern 1/3 of Biscayne Bay. The benthic communities in this environment consist of sea grass beds and hard bottom communities. In general, the sea grasses dominate the western portion of this system, and the hard bottom communities are mostly found along the eastern portion. Within the park, the average depth of the bay is 8 feet; maximum depth is 13 feet.

The terrestrial system consists of a narrow fringe of mangrove shoreline located along the park's western boundary and 42 keys or islands. With the exception of the Arsenicker keys and 5 spoil islands that lie off the western bay shoreline (located at the extreme southern end of the bay) these islands form a natural north—south barrier between Biscayne Bay and the coral reef platform. The keys contain various habitats including hardwood hammocks, mangrove wetlands, sandy beaches, and rocky intertidal areas.

## 1.4 FIRE MANAGEMENT OBJECTIVES

National Park Service Wildland Fire Management Guidelines (DO-18) requires that all parks with vegetation capable of sustaining fire develop a wildland fire management plan that will meet the specific resource management objectives for that park and to ensure that firefighter and public safety are not compromised. This guideline identifies fire as the most aggressive natural resource management tool employed by the National Park Service. The guideline further states that all wildland fires are classified as either wildland fires or prescribed fires. Prescribed fires and wildland fire use may be authorized by an approved wildland fire management plan and contribute to a park's resource management objectives. Human-caused wildland fires are unplanned events and may not be used to achieve resource management objectives by a park. At Biscayne National Park, human-caused wildland fires or prescribed fires will not be used to achieve resource management objectives.

**Wildland** is an area in which development is essentially nonexistent, except for roads, railroads, power lines, and similar transportation facilities. Structures, if any, are widely scattered.

**Wildland Fires** are any non-structural fires, other than prescribed fires, that occur in the wildland. This term encompasses fires previously called both wildfires and prescribed natural fires.

**Prescribed Fires** are any fires ignited by management actions in defined areas under predetermined weather and fuel conditions to meet specific objectives.

**Wildland fire use** is the management of naturally ignited (*e.g.* lightning) wildland fires to accomplish specific pre-stated resource management objectives in predefined geographic areas outlined in Fire Management Plans.

DO-18 identifies three paramount considerations for each park's fire management program. They are:

- Protect human life and property both within and adjacent to Park areas;
- Perpetuate, restore, replace, or replicate natural processes to the greatest extent practicable; and
- Protect natural and cultural resources and intrinsic values from unacceptable impacts attributable to fire and fire management activities

A 1983 General Management Plan/Development Concept Plan/Wilderness Study and Environmental Assessment (GMP/EA) was developed in order to provide guidance for the preservation, use, development, and operation of the park, as well as to evaluate the suitability of park lands for wilderness designation under the Wilderness Act. As per the GMP/EA, the park's management objectives include the following:

- To manage the park's natural resources in a positive and scientific manner so as to protect, to the greatest degree possible, the complex and interrelated biological and geological processes.
- To identify, evaluate, and preserve cultural resources in accordance with legislative and executive requirements and NPS policy.
- To encourage and participate in natural and social scientific research for the purposes of developing adequate baseline data and monitoring changes in park resources.
- To cooperate with the State of Florida, Dade County, and other appropriate local and Federal agencies, citizens' organizations, and quasi-public agencies to ensure the maximum protection of park resources and scenic values....

A new GMP is currently under development for the park. The Fire Management Plan will be revised as appropriate to incorporate any new management direction provided by this GMP.

The park's 1995 Resource Management Plan includes the following goals and objectives:

- Goal: Maintain and improve water quality.
  - Objective: Address/mitigate for presence of contaminants.
- Goal: Protect and preserve natural resources of park and adjacent areas.
  - Objective: Address external threats to park resources.
  - Objective: Restore critical habitat.
- Goal: Develop a better understanding of the park's resources, the interrelationships among the various components, and the requirements for their management.

- Objective: Data management.
- Objective: Document trends in biological populations.
- Goal: Protect and preserve cultural resources.
  - Objective: Protect upland archeological sites.
  - Objective: Catalogue/archive artifacts.
- Goal: Conduct park operations within NPS guidelines.

At Biscayne National Park, all wildland fires, regardless of ignition source, will be suppressed via the appropriate initial attack response. Non-fire applications will be used to maintain existing defensible space around all park buildings. The park's fire management goals, which follow, incorporate the park's overall management objectives as well as previously-discussed Federal fire management policy principles and goals, including firefighter and public safety, collaboration, and accountability.

Principle #3 of the *2001 Federal Fire Policy* states that "fire management plans, programs, and activities [will] support general and resource management plans and their implementation." This Fire Management Plan serves as a detailed and comprehensive program of action to implement Federal fire management policy principles and goals, which in turn support the park's general and resource management plan objectives, as well as its enabling legislation. Specifically:

- Wildland fire suppression will serve to protect human life, property, and natural and cultural resources from the adverse effects of unwanted fire.
- Mechanically maintaining existing defensible space around all park buildings will serve to protect them in the event of a wildland fire.

The overall objectives of the Biscayne National Park Fire Management Plan are the following:

- Suppress all wildland fire in a cost-effective manner, consistent with resource objectives, considering firefighter and public safety (always the highest priority), and values to be protected.
- Use non-fire applications to maintain existing defensible space around all park buildings.
- Manage all wildland fire incidents in accordance with accepted interagency standards, using appropriate management strategies and tactics, and maximizing efficiency via intra- and interagency coordination and cooperation.
- Maintain existing or develop new cooperative agreements with state and local agencies in order to facilitate close working relationships and mutual cooperation regarding fire management activities.

- Develop and conduct a monitoring program with recommended standard monitoring levels commensurate with the scope of the fire management program, and use the information gained to continually evaluate and improve the fire management program.
- Integrate knowledge gained through natural and cultural resource research into future fire management decisions and actions.
- Maintain the highest standards of professional and technical expertise in planning and safely implementing an effective fire management program.
- Plan and conduct all fire management activities in accordance with all applicable laws, policies and regulations.
- Incorporate the minimum impact suppression tactics policy into all suppression activities, to the greatest extent feasible and appropriate.

## 1.5 SCOPING ISSUES AND IMPACT TOPICS

On April 14, 2004, the park displayed public notices on the Park's website and also at various public billboards located in surrounding communities, and mailed scoping letters to the Florida Fish and Wildlife Conservation Commission, and to the Florida Department of Environmental Protection describing the Proposed Action and inviting public comment. The public scoping period ended on May 5, 2004. No public comments were received. As a result, park personnel developed all alternatives and impacts to be considered in this EA. Issues determined to be important were those related to the effects of the proposed action, and those not already adequately addressed by laws, regulations, and policies. Important issues were considered in developing and evaluating the alternatives to the Proposed Action discussed in this EA.

### 1.5.1 *Impact Topics Considered in this EA*

Impact topics are derived from issues raised during internal and external scoping. Not every conceivable impact of a proposed action is substantive enough to warrant analysis. The following topics, however, do merit consideration in this EA:

**Soils:** Low and moderate-severity fires can benefit soils through a fertilization effect, while high-intensity fires can damage soils; therefore, impacts to soils are analyzed in this EA.

**Water Resources (including Floodplains):** NPS policies require protection of water resources consistent with the Federal Clean Water Act. Thinning treatments and fire suppression efforts can adversely impact water quality (sediment delivery, turbidity); therefore, impacts to water resources are analyzed in this EA.

**Vegetation:** The primary terrestrial vegetation communities that occur at Biscayne Bay National Park are mangrove wetlands and hardwood hammocks. Wildland fire suppression efforts can impact vegetation communities and rare plant species; therefore, impacts to vegetation are analyzed in this EA.

**Wildlife:** There are resident populations of various species of reptiles, amphibians, birds, mammals, fish, and invertebrates that can be adversely and/or beneficially impacted by wildland fire suppression activities. Therefore, impacts to wildlife are evaluated in this EA.

**Threatened and Endangered Species:** The Federal Endangered Species Act prohibits harm to any species of fauna or flora listed by the U. S. Fish and Wildlife Service (USFWS) as being either threatened or endangered. Such harm includes not only direct injury or mortality, but also disrupting the habitat on which these species depend. Biscayne National Park contains several state and Federally listed threatened and endangered species, therefore, impacts to T&E species are analyzed in this EA.

**Air Quality:** The Federal 1970 Clean Air Act stipulates that Federal agencies have an affirmative responsibility to protect a park's air quality from adverse air pollution impacts. All types of fires generate smoke and particulate matter, which can impact air quality within the park and surrounding region. In light of these considerations, air quality impacts are analyzed in this EA.

**Visitor Use and Experience:** The 1916 NPS Organic Act directs the Service to provide for public enjoyment of the scenery, wildlife and natural and historic resources of national parks "in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations." Fire management activities can result in the temporary closure of certain areas and/or result in visual impacts that may affect the visitor use and experience of the park. Therefore, potential impacts of the proposed FMP on visitor use and experience are addressed in this EA.

**Human Health and Safety:** Wildfires can be extremely hazardous, even life-threatening, to humans, and current Federal fire management policies emphasize that firefighter and public safety is the first priority; all Fire Management Plans must reflect this commitment (NIFC, 1998). Therefore, impacts to human health and safety are addressed in this EA.

**Cultural Resources:** Section 106 of the National Historic Preservation Act of 1966, as amended, provides the framework for Federal review and protection of cultural resources, and ensures that they are considered during Federal project planning and execution. Cultural resources at the park include prehistoric sites that provide evidence of aboriginal settlement of the Biscayne Bay region; historic shipwrecks; submerged historic non-shipwreck sites (e.g. docks, ballast piles, navigation aids, etc.); archeological ruins related to nineteenth- and early-twentieth-century homesteading and pioneer settlements; and the buildings and structures from the Honeywell complex, a private resort associated with the development of the Miami area as a vacation destination during the first half of the twentieth century. These cultural resources can be affected by fire itself and fire suppression activities, thus potential impacts to cultural resources are addressed in this EA.

**Park Operations:** Severe fires can potentially affect operations at national parks, especially in more developed sites like visitor centers, campgrounds, administrative and maintenance facilities. These impacts can occur directly from the threat to facilities of an approaching fire, and more indirectly from smoke and the diversion of personnel to firefighting. Fires have caused

closures of facilities in parks around the country. Thus, the potential effects of the FMP alternatives on park operations will be considered in this EA.

### *1.5.2 Impact Topics Considered but dropped from Further Analysis*

NEPA and the CEQ Regulations direct agencies to “avoid useless bulk...and concentrate effort and attention on important issues” (40 CFR 1502.15). Certain impact topics that are sometimes addressed in NEPA documents on other kinds of proposed actions or projects have been judged to not be substantively affected by any of the FMP alternatives considered in this EA. These topics are listed and briefly described below, and the rationale provided for considering them, but dropping them from further analysis.

**Noise:** Noise is defined as unwanted sound. Fuels reduction, prescribed fires and fire suppression efforts can all involve the use of noise-generating mechanical tools and devices with engines, such as chain saws and trucks. Chain saws, at close range, are quite loud (in excess of 100 decibels). The use of machines, such as chainsaws, would be infrequent in light of the limited thinning to be conducted on the park (on the order of hours, days, or at most weeks per year). This is not frequent enough to substantially interfere with human activities in the area or with wildlife behavior. Nor will such infrequent bursts of noise chronically impact the solitude and tranquility associated with the park. Therefore, this impact topic is eliminated from further analysis in this EA.

**Waste Management:** None of the FMP alternatives would generate noteworthy quantities of either hazardous or solid wastes that need to be disposed of in hazardous waste or general sanitary landfills. Therefore this impact topic is dropped from additional consideration.

**Utilities:** Generally speaking, some kinds of projects, especially those involving construction, may temporarily impact above and below-ground telephone, electrical, natural gas, water, and sewer lines and cables, potentially disrupting service to customers. Other proposed actions may exert a substantial, long-term demand on telephone, electrical, natural gas, water, and sewage infrastructure, sources, and service, thereby compromising existing service levels or causing a need for new facilities to be constructed. None of the FMP alternatives will cause any of these effects to any extent, and therefore utilities are eliminated from any additional analysis.

**Land Use:** Visitor and administrative facilities occur within the park. Fire management activities would not affect land uses within the park or in areas adjacent to it; therefore, land use is not included for further analysis in this EA.

**Socio-economics:** NEPA requires an analysis of impacts to the “human environment” which includes economic, social and demographic elements in the affected area. Fire management activities may bring a short-term need for additional personnel in the park, but this addition would be minimal and would not affect the neighboring community’s overall population, income and employment base. Therefore, this impact topic is not included for further analysis in this EA.



**Transportation:** None of the FMP alternatives would substantively affect road, railroad, water-based, or aerial transportation in and around the park. One exception to this general rule would be the temporary closure of nearby roads during fire suppression activities or from smoke emanating from wildland fires. Over the long term, such closures would not significantly impinge local traffic since they would be both very infrequent and of short duration (on the magnitude of 1 to several hours). Therefore, this topic is dismissed from any further analysis.

**Environmental Justice / Protection of Children:** Presidential Executive Order 12898 requires Federal agencies to identify and address disproportionate impacts of their programs, policies and activities on minority and low-income populations. Executive Order 13045 requires Federal actions and policies to identify and address disproportionately adverse risks to the health and safety of children. None of the alternatives would have disproportionate health or environmental effects on minorities or low-income populations as defined in the Environmental Protection Agency's Environmental Justice Guidance; therefore, these topics are not further addressed in this EA.

**Indian Trust Resources:** Indian trust assets are owned by Native Americans but held in trust by the United States. Indian trust assets do not occur within Biscayne National Park and, therefore, are not evaluated further in this EA.

**Prime and Unique Agricultural Lands:** Prime farmland has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Unique land is land other than prime farmland that is used for production of specific high-value food and fiber crops. Both categories require that the land is available for farming uses. There are no prime and unique agricultural lands within the boundaries of Biscayne National Park; therefore, this impact topic is not evaluated further in this EA.

**Wilderness:** According to National Park Service Management Policies (2001), proposals having the potential to impact wilderness resources must be evaluated in accordance with National Park Service procedures for implementing the National Environmental Policy Act. Since there are no proposed or designated wilderness areas within or adjacent to the park, wilderness impacts are not further evaluated in this EA.

**Resource Conservation, Including Energy, and Pollution Prevention:** The National Park Service's *Guiding Principles of Sustainable Design* provides a basis for achieving sustainability in facility planning and design, emphasizes the importance of biodiversity, and encourages responsible decisions. The guidebook articulates principles to be used such as resource conservation and recycling. Proposed project actions would not minimize or add to resource conservation or pollution prevention on the park and, therefore, this impact topic is not evaluated further in this EA.

Table 1-1 Impact Topics for Biscayne National Park Fire Management Plan EA

Impact Topic	Retained or Dismissed from Further Evaluation	Relevant Regulations or Policies
Soils	Retained	NPS <i>Management Policies 2001</i>
Water Resources	Retained	Clean Water Act; Executive Order 12088; NPS <i>Management Policies</i>
Floodplains and Wetlands	Retained	Executive Order 11988; Executive Order 11990; Rivers and Harbors Act; Clean Water Act; NPS RM- 7
Vegetation	Retained	NPS <i>Management Policies</i>
Wildlife	Retained	NPS <i>Management Policies</i>
Threatened and Endangered Species and their Habitats	Retained	Endangered Species Act; NPS <i>Management Policies</i>
Air Quality	Retained	Federal Clean Air Act (CAA); CAA Amendments of 1990; NPS <i>Management Policies</i>
Visitor Use and Experience	Retained	NPS <i>Management Policies</i>
Human Health & Safety	Retained	NPS <i>Management Policies</i>
Cultural Resources	Retained	Section 106; National Historic Preservation Act; 36 CFR 800; NEPA; Executive Order 13007; Director's Order #28; NPS <i>Management Policies</i>
Park Operations	Retained	NPS <i>Management Policies</i>
Noise	Dismissed	NPS <i>Management Policies</i>
Waste Management	Dismissed	NPS <i>Management Policies</i>
Utilities	Dismissed	NPS <i>Management Policies</i>
Land Use	Dismissed	NPS <i>Management Policies</i>
Socioeconomics	Dismissed	40 CFR Regulations for Implementing NEPA; NPS <i>Management Policies</i>
Transportation	Dismissed	NPS <i>Management Policies</i>
Environmental Justice	Dismissed	Executive Order 12898
Indian Trust Resources	Dismissed	Department of the Interior Secretarial Orders No. 3206 and No. 3175
Prime and Unique Agricultural Lands	Dismissed	Council on Environmental Quality 1980 memorandum on prime and unique farmlands
Wilderness	Dismissed	The Wilderness Act; Director's Order #41; NPS <i>Management Policies</i>
Resource Conservation, Including Energy, and Pollution Prevention	Dismissed	NEPA; NPS <i>Guiding Principles of Sustainable Design</i> ; NPS <i>Management Policies</i>

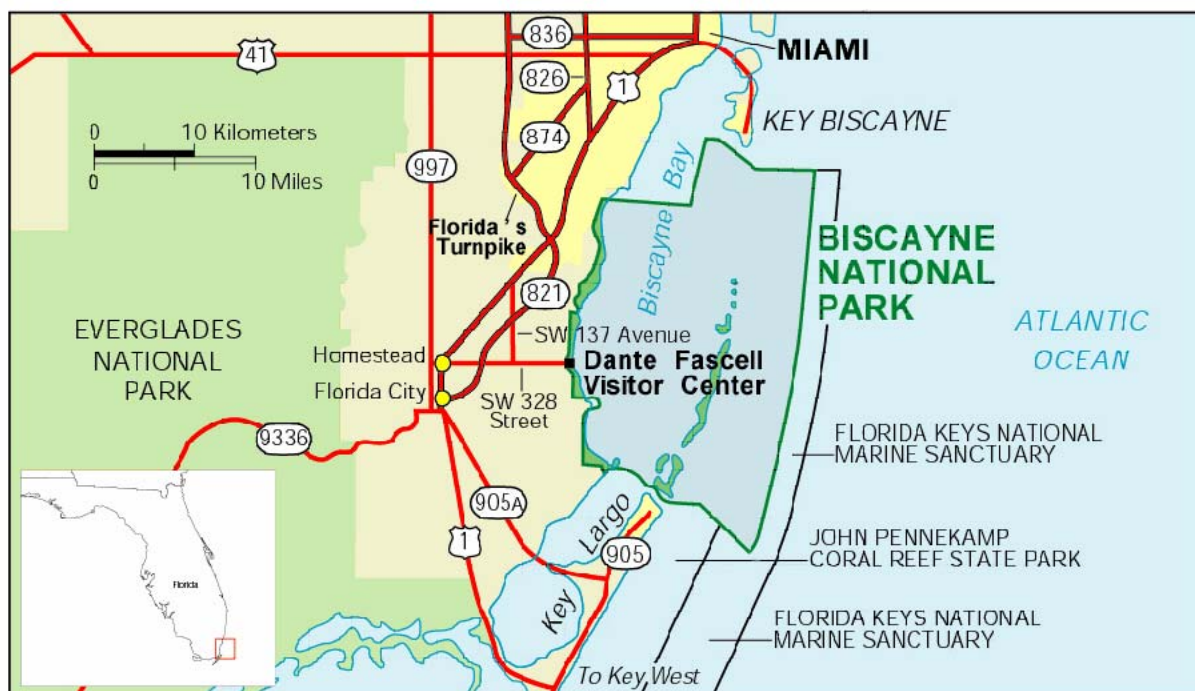


Figure 1-1 Biscayne National Park Vicinity

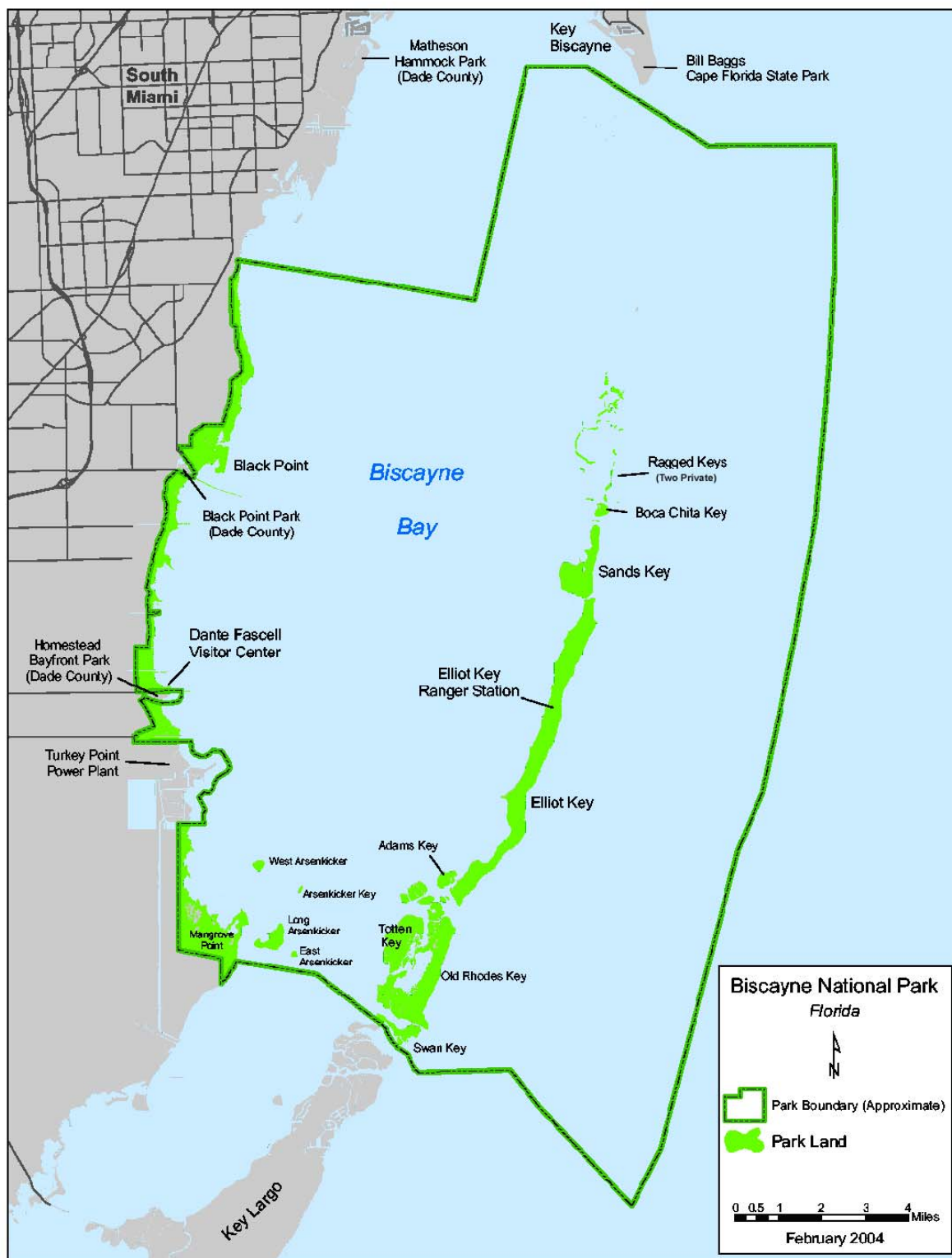


Figure 1-2 Biscayne National Park

## Chapter 2 - Issues and Alternatives

This Chapter describes the range of alternatives, including the Proposed Action and No Action Alternatives, formulated to address the purpose of and need for the proposed project. These alternatives were developed through evaluation of the comments provided by individuals, organizations, governmental agencies, and the Interdisciplinary Team (IDT).

### 2.1 ALTERNATIVES CONSIDERED BUT NOT ANALYZED FURTHER IN THIS EA

#### 2.1.1 *Fire Management Plan to include Wildland Fire or Prescribed Fire Use*

Wildland fire use involves the management of fires ignited by natural means (usually lightning) that are permitted to burn under specific environmental conditions for natural resource benefits. In many cases, national parks and forests employ wildland fire use as a part of their fire management program to obtain natural resource benefits from wildfire. These parks and forests typically have large acreages and the areas identified for its use contains few, if any, private residences and structures nearby (wildland urban interface). In such cases, wildland fire use is a critical component in meeting fire management objectives of Federal agencies. Prescribed Fires are any fires ignited by management actions in defined areas under predetermined weather and fuel conditions to meet specific management objectives.

This alternative was considered but not analyzed further in this EA because, according to park officials, fire is not a natural part of the park's ecosystem, and that the occurrence of naturally ignited wildland fires is extremely low to almost non-existent. Although fire is a necessary characteristic of many forest communities in south Florida, the hardwood hammock is intolerant of fire. In addition, the mangrove wetlands, with the exception of small, isolated patches of marsh grass, lack embedded sawgrass or cordgrass prairies, and thus do not support wildland fire. The only wildland fires that would occur would be human caused wildland fires and as described in Section 1.4, human-caused wildland fires are unplanned events and may not be used to achieve resource management objectives by a park. Park staff concluded that the potential risks to human health and safety and natural/cultural resources under this alternative greatly outweigh any potential resource benefits that would be obtained from including wildland or prescribed fire use in the Fire Management Plan.

## 2.2 ALTERNATIVES CONSIDERED AND ANALYZED IN THIS EA

Due to limited range of possible fire management activities being considered by the staff at Biscayne National Park, only two alternatives are being considered for this EA.

### 2.2.1 *Alternative 1 (No Action Alternative) - Fire Management Plan to Include Wildland Fire Suppression and Maintenance of Existing Defensible Space Surrounding Park Structures.*

Under this alternative, the park would continue to operate without the guidance of a Fire Management Plan. Under this alternative, all wildland fires within the park would be suppressed immediately and in a manner that minimizes the negative environmental impacts of suppression activities. Examples of suppression tactics that may cause environmental harm include building of firelines, the use of chemical fire retardant near waterbodies, and the excessive cutting of trees. All wildfire suppression activities would adhere to Minimum Impact Suppression Tactics (MIST) guidelines as outlined in Section 2.3 *Mitigation Measures and Monitoring*.

Manual and mechanical thinning (e.g. lawn mowers) would be utilized to reduce fuel loads and maintain defensible space of at least 30 feet around park structures.

### 2.2.2 *Alternative 2 (Preferred Alternative) - Fire Management Plan to Include Wildland Fire Suppression, Maintenance of Existing Defensible Space Surrounding Park Structures, and the Burning of Debris Piles*

Under this alternative, Biscayne National Park has been divided into three fire management units (FMUs) to facilitate the achievement of fire management objectives (See Figure 2.1).

- FMU #1 contains approximately 4,825 acres. Development within this FMU is concentrated at the built-up land on Convoy Point, including the park headquarters and visitor center; visitor and staff parking areas; staff housing; a maintenance and storage area; temporary storage sheds; a field laboratory and dive locker; a picnic area with tables, grills, and restrooms; park and public boat basins; docks; and a park boat ramp.

#### **Fire Management Unit (FMU)**

Any land management area definable by objectives, topographic features, access, values-to-be-protected, political boundaries, fuel types, or major fire regimes, etc., that sets it apart from management characteristics of an adjacent unit. FMUs are delineated in Fire Management Plans (FMP). These units may have dominant management objectives and pre-selected strategies assigned to accomplish these objectives. (NPS, 2001)

Fire management objectives within this FMU include: Suppress any wildland fire via the appropriate initial attack response; control 100% of all wildland fires during initial attack; and maintain existing defensible space of at least 30 feet around park buildings.

- FMU #2 contains 1,838.5 acres, divided between Boca Chita Key (32.12 acres), Elliott Key (1727.27 acres), and Adams Key (79.07 acres).

Fire management objectives within this FMU include: Suppress wildland fire via the appropriate initial attack response; and maintain existing defensible space of at least 30 feet around park buildings.

- FMU #3 contains the remaining islands/keys within park boundaries, comprising approximately 2,411.5 acres.

Fire management objective within this FMU include the suppression of wildland fire via the appropriate initial attack response.

Under this alternative, all wildland fires within the park would be suppressed immediately and in a manner that minimizes the negative environmental impacts of suppression activities. Examples of negative impacts resulting from suppression activities include excessive cutting of trees, use of heavy machinery in sensitive areas, and the use of fire retardants near water bodies. All wildfire suppression activities would adhere to Minimum Impact Suppression Tactics (MIST) guidelines as outlined in Section 2.3 *Mitigation Measures and Monitoring*. Manual and mechanical thinning (e.g. lawn mowers) would be utilized to reduce fuel loads around park structures to maintain a defensible space of at least 30 feet and adjacent to park boundaries and cultural sites.

There are areas on park keys where park staff pile cut exotic vegetation. There are also palm trees located throughout the park, which frequently shed their fronds. As the palm fronds fall in high visitor use areas, they are collected by maintenance staff as part of the park's grounds maintenance program. Additionally, coastal clean-up activities on barrier islands and vegetation removal in proximity to sites listed on the National Register of Historic Places are periodically conducted to promote resources preservation and protection stewardship. These activities also result in woody fiber and other combustible, non-toxic materials being collected and organized into debris piles. Burning these debris piles is the preferred course of action for two reasons: 1) it is impractical and cost-prohibitive to haul the debris off the keys/islands, and 2) burning serves to destroy the seed bank and live vegetative materials contained in the debris and thus prevent further spread and re-infestation of exotic, invasive species.

As per RM-18 (chapter 10, section VIII),

Fire may be used to dispose of wildland fuels generated from maintenance activities (such as grass or brush mowing or clippings), hazard tree removal, or during construction activities. These materials must be deemed infeasible or impractical to mechanically remove and must be in a non-wildland fuel environment (parking lot, boneyard, gravel pit, etc.)....All such activities and all new debris burning projects will be reviewed by a fire management officer, or appointed staff person, having wildland fire knowledge, in areas without a fire management officer.

If, after consultation with the fire management officer, it is determined that a debris disposal burn will meet all of the following conditions then it may be conducted within debris disposal guidelines.

1. Has virtually no chance to exceed the perimeter of the non-wildland environment.

2. Will not damage surrounding natural or cultural resources.
3. Does not present a safety threat to crew members.
4. Will not require curtailment during the burning operation.
5. Will not require a prescribed fire burn boss or fire-qualified personnel to implement.
6. Requires no follow-up monitoring to evaluate environmental impacts.

Otherwise, it will constitute a prescribed fire and must comply with all requirements for that type of activity.

For debris burns, all personnel would wear appropriate personal protective equipment. The supervisor of the burn would notify appropriate agencies (air quality, local fire departments, etc.) and neighbors and obtain all needed permits, and would develop an appropriate safety and evacuation plan in case of injuries or other emergencies. The crew should include someone who has previously conducted a similar burn at the site or a similar site.

Vegetation removed would be transported to island maintenance areas, such as the Elliott Key maintenance compound to burn the debris. In all instances requiring debris burns, the six conditions as addressed in RM-18 (chapter 10, section VIII) would apply.

#### *2.2.4 Environmentally Preferred Alternative*

The National Park Service is required to identify the environmentally preferred alternative(s) for any of its proposed projects. That alternative is the alternative that will promote the national environmental policy expressed in NEPA (Section 101 (b)). This includes alternatives that:

- 1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- 2) ensure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;
- 3) attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
- 4) preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
- 5) achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and
- 6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

In essence, the environmentally preferred alternative would be the one(s) that "causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources" (CEQ, 1978).



In this case, Alternative 2 is the environmentally preferred alternative for Biscayne National Park since it best meets goals 1, 2, 3, and 4 described above. Under these alternatives, fire suppression activities would help protect park resources and adjacent lands from the threat of wildland fires. Finally, the alternative best protects and helps preserve the historic, cultural, and natural resources in the park for current and future generations.

## 2.3 MITIGATION MEASURES AND MONITORING

Biscayne National Park will collect information on fuel reduction efforts, vegetative resources, and other objective dependant variables after a wildland fire. During fire events, data will be collected regarding the current fire conditions consistent with the variables identified in a prescribed fire plan, such as fuel and vegetation type, anticipated fire behavior and fire spread, current and forecasted weather, smoke volume and dispersal, etc.

Mitigation measures are prescribed to prevent and/or mitigate adverse environmental impacts that may occur from fire suppression activities. Mitigation measures are applicable to both alternatives.

### 2.3.1 Fire Management Activities

- All suppression guidelines will follow Minimum Impact Suppression Tactics (MIST) guidelines. These include:
  - Keeping fire engines on existing roads.
  - Restricting the use of heavy equipment for constructing fireline. A bulldozer or plow may be used for fireline construction only in extreme situations to protect human life and property, and then only with the authorization of the park superintendent or designee. Plow lines will be kept as shallow as possible, and will undergo archeological investigation as soon as possible after the event.
  - Using existing natural fuel breaks and human-made barriers, wet line, or cold trailing the fire edge in lieu of fireline construction whenever possible.
  - Keeping fireline width as narrow and shallow as possible when it must be constructed.
  - Avoid ground disturbance within known natural (e.g. critical habitat, known areas where T&E species exist) and archeological/cultural/historic resource locations. When fire line construction is not discretionary and deemed necessary to protect human life or property in proximity to these resource locations, it will involve as little ground disturbance as possible and be located as far outside of resource boundaries as possible;
  - Avoiding ground disturbance within known natural and archeological/ethnographic/historic resource locations. When fireline construction is necessary in proximity to these resource locations, it will involve as little ground disturbance as possible and be located as far outside of resource boundaries as possible.
  - Using water instead of fire retardant. If retardant must be used, using a non-fugitive type, and avoiding bodies of water.

- Using soaker hose, sprinklers or foggers in mop-up; avoiding boring and hydraulic action.
- Minimizing cutting of trees.

### *2.3.2 Air and Water Resources (Including Floodplains)*

- The park will comply with the Clean Air Act, the Clean Water Act, and all other applicable Federal, state, and local laws and requirements. Additionally:
  - The suppression response selected to manage a wildland fire will consider air quality standards.
  - During fire suppression, water will be used in lieu of fire retardant whenever possible. If retardant must be used, a non-fugitive type will be chosen, and bodies of water avoided.

### *2.3.3 Natural and Cultural Resources*

- Natural and cultural resources will be protected from the adverse effects of unwanted fire as well as the adverse effects of wildland fire suppression activities. During all fire management activities, the minimum impact tactics policy will be incorporated to the greatest extent feasible and appropriate, employing methods least damaging to park resources for the given situation.

### *2.3.4 Property*

- To the greatest extent feasible and appropriate, park infrastructure, any other development, and adjacent non-agency land (with numerous structures) will be protected during all fire management activities.

### *2.3.5 Human Health and Safety*

- Firefighter and public safety is the highest priority in every fire management activity. In light of this:
  - Only fully qualified (i.e. meeting NPS qualifications and accepted interagency knowledge, skills and abilities for the assigned fire job), red-carded employees will be assigned fire management duties (unless assigned as trainees, in which case they will be closely supervised by an individual fully qualified for the given position).
  - No fire management operation will be initiated until all personnel involved have received a safety briefing describing known hazards and mitigating actions (LCES)<sup>4</sup>, current fire season conditions, and current and predicted fire weather and behavior. Hazards specific to the park include:
    - Stinging/biting insects and poisonous snakes.
    - Dehydration, heat exhaustion and heat stroke.
    - Lightning
    - Snags and dead trees with weak root systems

- Wildland fire incident commanders and prescribed fire bosses will minimize firefighter exposure to heavy smoke by incorporating the recommendations outlined in the publication Health Hazards of Smoke (Sharkey 1997).
- Park neighbors, visitors and local residents will be notified of all planned and unplanned fire management events that have the potential to impact them.
- The park superintendent or designee may, as a safety precaution, temporarily close all or part of the park to the visiting public.
- Smoke on roadways will be monitored and traffic control provisions taken to ensure motorist safety during fire events at the park. The following procedures will be taken to compensate for reduced visibility when a paved road is affected by smoke (the incident commander or prescribed fire boss on a particular event will determine visibility levels):
  - Posting of “Smoke on Road” signs on either side of the affected area.
  - Reducing the posted speed limit when visibility is strongly reduced, and escorting vehicles with a well-marked law enforcement vehicle as necessary.
  - Closing the road to traffic when visibility is severely reduced.
- During debris burning, all personnel will wear appropriate personal protective equipment.

## 2.3 IMPACT DEFINITIONS

Table 2-1 depicts the impact definitions used in this Environmental Assessment. The analysis of impacts considers direct, indirect, and cumulative impacts, with a particular emphasis on the potential for any impact or action to impair the resources or values of the site. Significant impact thresholds for the various key resources were determined in light of compliance with existing state and Federal laws, and compliance with existing Biscayne National Park planning documents.

Table 2-1 Impact Definitions

Key Resources	“Minor” Impact	“Moderate” Impact	“Major” Impact	Duration
Soils	The beneficial/adverse effects to soils would be detectable, but likely short-term. Damage to or loss of the litter/humus layers that causes slight localized increases in soil loss from erosion; effects to soil productivity or fertility would be small, as would the area affected; short-term and localized compaction of soils that does not prohibit re-vegetation; if mitigation were needed to offset adverse effects, it would be relatively simple to implement and likely successful.	The beneficial/adverse effects on soil productivity or fertility would be readily apparent, long term, and result in a change to the soil character over a relatively wide area; fire severe enough to cause a noticeable change in soil community; intermittent areas of surface sterilization of soils that may cause some long term loss of soil productivity that may alter a portion of the vegetation community; short-to long-term and localized compaction of soils that may prohibit some re-vegetation; mitigation measures would probably be necessary to offset adverse effects and would likely be successful.	The beneficial/adverse effects on soil productivity or fertility would be readily apparent, long-term, and substantially change the character of the soils over a large area in and out of the park. Damage to or loss of the litter/humus layers that would increase soil loss from erosion on a substantial portion of the burn area; fire severe enough to cause substantial damage to the soil community; substantial surface sterilization of soils that may cause long term loss of soil productivity and that may alter or destroy the vegetation community over most of the burned area; long-term and widespread soil compaction that affects a large number of acres and prohibits re-vegetation; mitigation measures to offset adverse effects would be needed, extensive, and their success could not be guaranteed.	<u><b>Short-Term</b></u> Recovers in less than 3 years  <u><b>Long-Term</b></u> Takes more than 3 years to recover
Water Resources (Including Wetlands and Floodplains)	Adverse changes in water quality would be measurable, although small, likely short-term, indirect, and localized; localized and indirect riparian impacts that do not substantively increase stream temperatures or affect stream habitats; no alteration of natural hydrology of wetlands; A U.S. Army Corps of Engineers 404 permit would not be required; no filling or disconnecting of the floodplain; short-term impacts that do not affect the functionality of the floodplain; no mitigation measure associated with water quality would be necessary.	Adverse changes in water quality would be measurable and long-term but would be relatively local, direct and/or indirect; localized and indirect riparian impacts that may slightly increase stream temperatures or affect stream habitats; alteration of natural hydrology of wetlands would be apparent such that an U.S. Army Corps of Engineers 404 permit could be required; alteration of the floodplain apparent; wetland or floodplain functions would not be affected in the long-term; mitigation measures associated with water quality or hydrology would be necessary and the measures would likely succeed.	Adverse changes in water quality would be readily measurable, would have substantial consequences, direct and/or indirect, and would be noticed on a regional scale; localized and indirect riparian impact that may substantively increase stream temperatures or affect stream habitats; effects to wetlands or floodplains would be observable over a relatively large area and would be long-term, and would require a U.S. Army Corps of Engineers 404 permit; filling or disconnecting of the floodplain; long-term impacts that affect the functionality of the floodplain; mitigation measures would be necessary and their success would not be guaranteed.	<u><b>Short-Term</b></u> Recovers in less than 1 year  <u><b>Long-Term</b></u> Takes more than 1 year to recover

Table 2-1 Impact Definitions

Key Resources	“Minor” Impact	“Moderate” Impact	“Major” Impact	Duration
Vegetation	Beneficial/adverse short-term direct affects to some individual native plants and would also affect a relatively small portion of that species’ population; short-term changes in plant species composition and/or structure, consistent with expected successional pathways of a given plant community from a natural disturbance event; increase in invasive species in limited locations; occasional death of a canopy tree; mitigation to offset adverse effects, including special measures to avoid affecting species of special concern, could be required and would be effective.	The beneficial/adverse effects on some individual native plants along with a sizeable segment of the species’ population in the long-term and over a relatively large area; long-term changes in plant species composition and/or structure, consistent with expected successional pathways of a given plant community from a natural disturbance event; increases in invasive species do not jeopardize the overall native plant communities; repeated death of canopy trees; mitigation to offset adverse effects could be extensive, but would likely be successful; some species of special concern could also be affected.	Considerable beneficial/adverse long-term direct effects on native plant populations, including species of special concern, and affect a relatively large area in and out of the park; violation of the Endangered Species Act of 1973; widespread increase in invasive species that jeopardizes native plant communities; mitigation measures to offset the adverse effects would be required, extensive, and success of the mitigation measures would not be guaranteed.	<b>Short-Term</b> Recovers in less than 3 years  <b>Long-Term</b> Takes more than 3 years to recover
Wildlife	Temporary displacement of a few localized individuals or groups of animals; mortality of individuals of species not afforded special protection by state and/or Federal law; mortality of individuals that would not impact population trends; mitigation measures, if needed to offset adverse effects, would be simple and successful.	Beneficial/adverse direct and indirect effects to wildlife would be readily detectable, long-term and localized, with consequences affecting the population level(s) of specie(s); mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.	Beneficial/adverse direct and indirect effects to wildlife would be obvious, long-term, and would have substantial consequences to wildlife populations in the region; violation of the Endangered Species Act of 1973; mortality of a number of individuals that subsequently jeopardizes the viability of the resident population; extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.	<b>Short-Term</b> Recovers in less than 1 year  <b>Long-Term</b> Takes more than 1 year to recover
Air Quality	Adverse changes in air quality would be measurable, although the changes would be small, short-term, and the effects would be localized; temporary and limited smoke exposure to sensitive resources; no air quality mitigation measures would be necessary.	Adverse changes in air quality would be measurable, would have consequences, although the effect would be relatively local; all air quality standards still met; short-term exposure to sensitive resources; air quality mitigation measures would be necessary and the measures would likely be successful.	Adverse changes in air quality would be measurable, would have substantial consequences, and be noticed regionally; violation of state and Federal air quality standards; violation of Class II air quality standards; prolonged smoke exposure to sensitive receptors; air quality mitigation measures would be necessary and the success of the measures could not be guaranteed.	<b>Short-Term</b> Recovers in 7 days or less  <b>Long-Term</b> Takes more than 7 days to recover

Table 2-1 Impact Definitions

Key Resources	“Minor” Impact	“Moderate” Impact	“Major” Impact	Duration
Visitor Use & Experience	Temporary displacement of recreationists or closure of trails, and recreation areas during off-peak recreation use; temporary or short-term alteration of the vista, or temporary presence of equipment in localized area; smoke accumulation during off-peak recreation use. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.	Beneficial/adverse direct changes in visitor use and/or experience would be readily apparent and likely long-term. The visitor would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes.	Permanent closure of trails and recreation areas; conflict with peak recreation use; long-term change in scenic integrity of the vista; substantive smoke accumulation during peak recreation use. The visitor would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.	<p><b>Short-Term</b> Occurs only during the treatment effect</p> <p><b>Long-Term</b> Occurs after the treatment effect</p>
Human Health & Safety	The effects would be detectable and short-term, but would not have an appreciable effect on public health and safety; potential for small injuries to any worker or visitor (e.g. scrapes or bruises); limited exposure to hazardous compounds or smoke particulates at concentrations below health-based levels; if mitigation were needed, it would be relatively simple and likely successful.	The effects would be readily apparent and long-term, and would result in substantial, noticeable effects to public health and safety on a local scale; non-life threatening injuries to any worker or visitor; limited exposure to hazardous compounds or smoke particulates at concentrations at or slightly above health-based levels; mitigation measures would probably be necessary and would likely be successful.	The effects would be readily apparent and long-term, and would result in substantial noticeable effects to public health and safety on a regional scale; serious life-threatening injuries to any worker or member of the public; limited or prolonged exposure to hazardous compounds or smoke particulates at concentrations well above health-based levels; extensive mitigation measures would be needed, and their success would not be guaranteed.	<p><b>Short-Term</b> Occurs only during the treatment effect</p> <p><b>Long-Term</b> Occurs after the treatment effect</p>

Table 2-1 Impact Definitions

Key Resources	“Minor” Impact	“Moderate” Impact	“Major” Impact	Duration
Cultural Resources	For archeological resources, the impact affects an archeological site(s) with modest data potential and no significant ties to a living community’s cultural identity; temporary, non-adverse effects to registered cultural resource sites, eligible cultural resource sites, sites with an undetermined eligibility, and traditional cultural properties; no effect to the character defining features of a National Register of Historic Places eligible or listed structure, district, or cultural landscape	For archeological resources, the impact affects an archeological site(s) with high data potential and no significant ties to a living community’s cultural identity; temporary adverse effects to registered cultural resource sites, eligible cultural resource sites, sites with an undetermined eligibility, and traditional cultural properties, but would not diminish the integrity of the cultural resource to the extent that its National Register eligibility is jeopardized	For archeological resources, the impact affects an archeological site(s) with exceptional data potential or that has significant ties to a living community’s cultural identity; long-term adverse impacts to registered cultural resource sites, eligible cultural resource sites, sites with an undetermined eligibility, and traditional cultural properties that would diminish the integrity of the cultural resource to the extent that its National Register eligibility is jeopardized	<b><u>Short-Term</u></b> Treatment effects on the natural elements of a cultural landscape (e.g., three to five years until new vegetation returns)  <b><u>Long-Term</u></b> Because most cultural resources are non-renewable, any effects would be long term
Park Operations	The beneficial/adverse direct and indirect effects would be detectable and likely short-term, but would be of a magnitude that would not have an appreciable effect on park operations; short-term suspension of non-critical park operations; negligible impact to park buildings and structures; if mitigation were needed to offset adverse effects, it would be relatively simple and likely successful	The beneficial/adverse effects would be readily apparent, be long-term, and would result in a substantial change in park operations in a manner noticeable to staff and the public; long-term suspension of all park operations (1 to 2 days); detectable adverse impacts to park buildings and structures; mitigation measures would probably be necessary to offset adverse effects and would likely be successful	The beneficial/adverse effects would be readily apparent, long-term, would result in a substantial change in park operations in a manner noticeable to staff and the public and be markedly different from existing operations; prolonged suspension of all park operations; substantial adverse impacts to park buildings and structures; mitigation measures to offset adverse effects would be needed, would be extensive, and their success could not be guaranteed	<b><u>Short-Term</u></b> Effects lasting for the duration of the treatment action  <b><u>Long-Term</u></b> Effects lasting longer than the duration of the treatment action.

## 2.5 COMPARISON OF ALTERNATIVES

Table 2-2 briefly summarizes the environmental effects of the various alternatives. It provides a quick comparison of how well the alternatives respond to the project need, objectives, important issues and impact topics. Chapter 3 discusses the environmental consequences of the proposed alternatives in detail.

Table 2-2 Comparison of Alternatives' Impact Topics

	Alternative 1 - No Action Alternative	Alternative 2 – (Preferred Alternative) Suppress Wildland Fires and Maintenance of Defensible Space around Park Structures, Vegetative Debris Burning
Impact Topics		
Geology and Soils	Very minor short-term soil erosion impacts resulting from wildland fire suppression activities	Very minor short-term soil erosion impacts resulting from wildland fire suppression activities; minor, short-term, localized impacts from debris burning
Water Resources (including floodplains)	Minor, if any, direct water resources impacts	Minor, if any, direct water resources impacts
Vegetation	Fire suppression and maintenance activities could result in the mortality of individual native plants and trees in the areas where wildland fire suppression or maintenance is taking place. These impacts are expected to be minor because the loss of individual members of a given plant species would not jeopardize the viability of the populations on and adjacent to the park and limited to the area of suppression.	Fire suppression and maintenance activities could result in the mortality of individual native plants and trees in the areas where wildland fire suppression or maintenance is taking place. These impacts are expected to be minor because the loss of individual members of a given plant species would not jeopardize the viability of the populations on and adjacent to the park and limited to the area of suppression.
Impact Topics		
Wildlife	Wildland fire suppression activities would temporary displace some wildlife species; individual mortality of some species likely; no impact on Federal and/or State T&E species	Wildland fire suppression activities would temporary displace some wildlife species; individual mortality of some species likely; no impact on Federal and/or State T&E species
Air Quality	No air quality impacts	Very minor and temporary effects resulting from burning of debris



Table 2-2 Comparison of Alternatives' Impact Topics

	Alternative 1 - No Action Alternative	Alternative 2 – (Preferred Alternative) Suppress Wildland Fires and Maintenance of Defensible Space around Park Structures, Vegetative Debris Burning
Visitor Use and Experience (including Park Operations)	Minor and short-term impacts during suppression activities ( <i>e.g.</i> trail or road closures, presence of work crews in the vista); suppression activities may effect on park operations	Minor and short-term impacts during suppression activities ( <i>e.g.</i> trail or road closures, presence of work crews in the vista); suppression activities may effect on park operations; debris burning may affect visitor experience with the occurrence of smoke.
Human Health & Safety	Potential for injury to workers during wildland fire suppression activities	Potential for injury to workers during wildland fire suppression activities; possible injuries resulting from debris burning.
Cultural Resources	No impact to known cultural resources	No direct impact to known cultural resources; cultural landscape benefited from vegetation maintenance on many of the Park's archeological sites and historic structures.

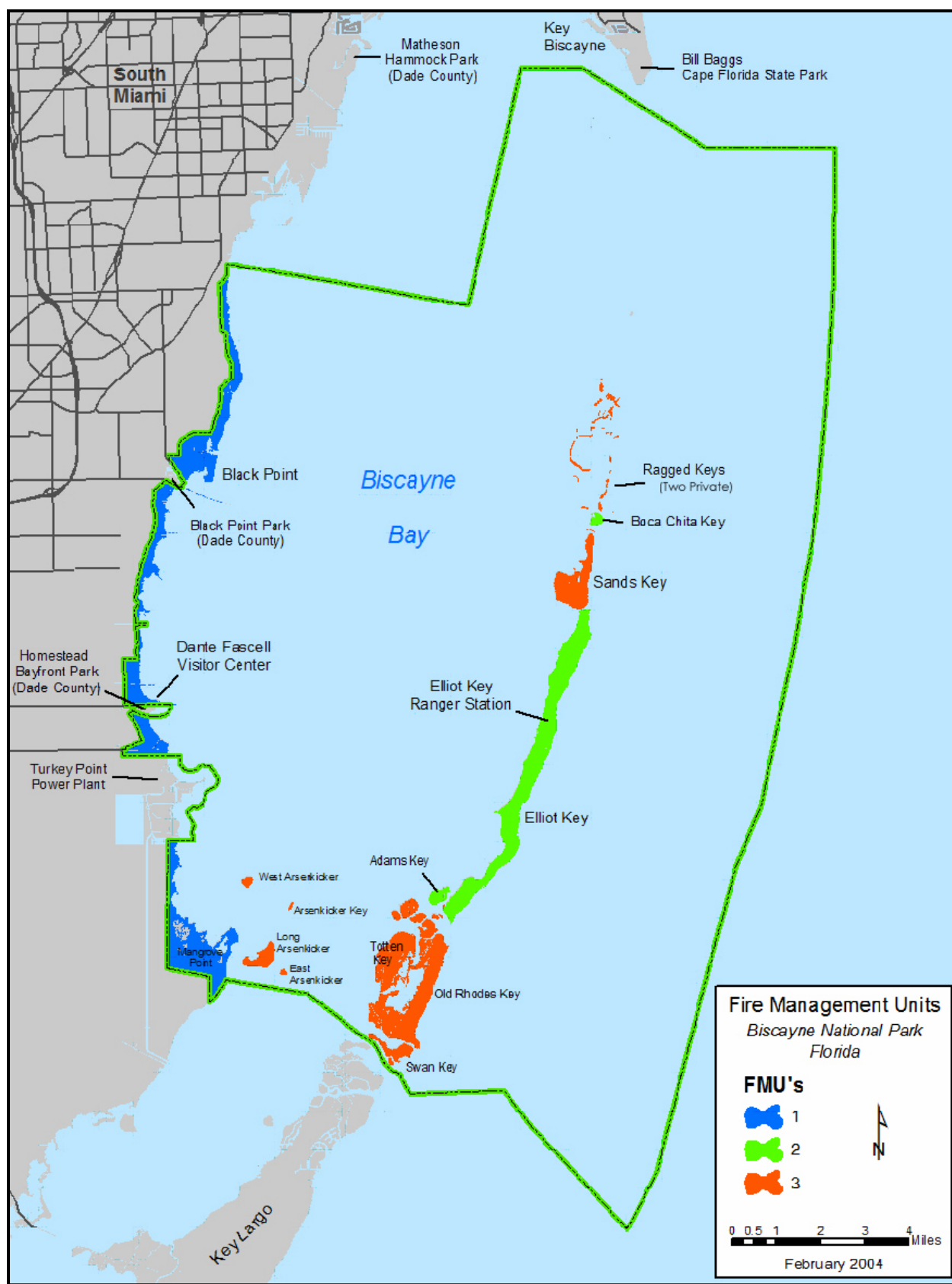


Figure 2-1 Biscayne National Park Fire Management Units

## Chapter 3 – Environmental Analysis

This chapter summarizes the existing environmental conditions and the probable environmental consequences (effects) of implementing the action and No-Action alternatives. This chapter also provides the scientific and analytical basis for comparing the alternatives. The probable environmental effects are quantified where possible; where not possible, qualitative descriptions are provided. Descriptions of the Affected Environments for the various impact topics were taken from the park's 1983 General Management Plan and 1995 Resource Management Plan, along with descriptions from park staff.

### 3.1 SOILS AND GEOLOGY

#### 3.1.1 *Affected Environment*

The total land area within the Park encompasses 9,075 acres and includes 4,825 acres of largely undeveloped mangrove shoreline on the park mainland, and 4,250 acres scattered across 42 islands/keys. In general, the Park can be divided into three major environments: coral reef, estuarine (Biscayne Bay), and terrestrial.

The terrestrial system consists of a narrow fringe of mangrove shoreline located along the Park's western boundary and 42 Keys or islands. With the exception of the Arsenicker Keys (located at the extreme southern end of the bay) these islands form a natural north—south barrier between Biscayne Bay and the coral reef platform. The soils tend to be shallow (with few exceptions, less than 20 cm deep) and organic turnover rates are extremely rapid.

The keys contain various habitats including hardwood hammocks, mangrove wetlands, sandy beaches, and rocky intertidal areas. The mangrove wetlands at the park are underlain by peat.

The upper Florida Keys, from Soldier Key (within the northern portion of Biscayne National Park) south to Big Pine Key, are the remains of a shallow coral patch reef that thrived one hundred thousand or more years ago, during the Pleistocene epoch. The ocean level subsided during the following glacial period, exposing the coral to die in the air and sunlight, forming limestone bedrock. The sand that accumulated above the water surface on this limestone bedrock became the home for drifting seeds of beach plants. As the seeds grew and developed, their roots stabilized the soil, allowing the development of coastal strand and hardwood hammock communities. These areas maintain a fine balance between accretionary and degradational processes, as soils tend to be shallow (with few exceptions, less than 20 cm deep) and organic turnover rates are extremely rapid.

#### 3.1.2 *Environmental Consequences*

Soil impacts were qualitatively assessed using professional judgment based on investigations of soil characteristics and information from the Park's 1995 Resource Management Plan.

### 3.1.2.1 Alternative 1 (No Action)

Proposed activities with the potential to impact soils include the digging of hand lines and the excessive use of water during wildland fire suppression activities, and the maintenance of defensible spaces around park structures.

Very minor and localized soil compaction would occur from wildfire suppression and thinning activities, and vehicle use would be restricted to existing roads. The digging of hand lines during wildfire suppression would result in soil disturbance and could potentially lead to increased erosion. During all suppression activities, the minimum impact suppression tactics policy would be incorporated to the greatest extent feasible and appropriate, employing methods least damaging to park resources for the given situation. For example, to minimize potential soil impacts, hand lines would be located outside of highly erosive areas, and other sensitive areas, and would use natural barriers (*e.g.* trails, roads) to the greatest extent possible.

In the very rare event that a wildland fire occurring at Biscayne National Park is severe enough to warrant the use of helicopter bucket drops to extinguish the fire, it is possible that limited, minor soil disturbance or erosion could occur directly where the water was dropped. However, these impacts would be minor because the water that was dropped would, for the most part, be intercepted by vegetation, which would lessen the water's impact on the soil. In addition, with the exception of the coastal berm on Elliott Key (~6 feet) the topography of the keys is extremely flat, which would allow for more water infiltration and lessen the possibility for runoff from the bucket drops to carry soils any great distances. In addition, the use of salt water in the bucket drops would not significantly impact soil quality. The park as a whole is a marine ecosystem and limited use of seawater to extinguish wildland fire would not greatly contribute to the natural salinity of the soils.

Maintenance of defensible spaces around park structures would not have any adverse impacts on the soils of the park. These areas are currently kept in grasses and maintained with the use of lawn mowers. Mowing would be restricted to periods when ground is dry enough to prevent rutting or other damage to soils.

### 3.1.2.2 Alternative 2 (Preferred Alternative)

Proposed activities with the potential to impact soils include the digging of hand lines and the excessive use of water during wildland fire suppression activities, the maintenance of defensible spaces around park structures, and the burning of debris piles. Impacts to soils with regards to wildland fire suppression activities and maintenance of defensible spaces around park structures would be the same as in the "No Action" Alternative.

Minor and localized soil impacts would result from the burning of debris piles. The high heat directly under the debris piles while burning would consume the organic layer of the soil, making it water repellant and unsuitable for plant growth. These impacts would be minor however because the debris pile would be small (<10 feet in diameter), and be established only in designated areas of the park suitable for burning.

### *Conclusion*

Both alternatives would have very minor, localized, and short-term soil erosion impacts resulting from wildland fire suppression activities. However, the burning of debris piles, as detailed in alternatives 2, would result in minor adverse impacts directly underneath the debris pile.

The implementation of any of the alternatives would not impair geologic and soil resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park's general management plan or other NPS planning documents.

## **3.2 WATER RESOURCES (INCLUDING FLOODPLAINS)**

### *3.2.1 Affected Environment*

Biscayne National Park encompasses a large portion of Biscayne Bay and the offshore waters south of Miami in Miami-Dade County. Biscayne Bay, designated an Outstanding Florida Water by the state legislature, covers approximately 428 square miles, with a contributing watershed of approximately 938 square miles. The Biscayne Bay watershed is highly urbanized and includes 16 percent of the state's population in an area that represents less than two percent of the land available in the state.

Water quality within the bay has been described as ranging from bad to near pristine (Mulliken and VanArman 1995). The majority of the water quality problems in the bay are located in the northern region and are associated with the city of Miami. Surface water runoff from urban land uses has been identified as the major source of contaminants in the bay.

The Miami-Dade County Department of Environmental Resources Management has conducted water quality monitoring in Biscayne Bay since 1979. Data are collected from about 100 sampling stations. Monitoring includes physical and meteorological observations, including such features as water depth, water temperature, and air temperature, plus analysis for 22 water quality parameters.

The Federal Emergency Management Agency mapped the floodplains of Dade County in 1980. With the exception of limited areas of higher ground near Cutler Ridge and Homestead, the 100-year floodplain extends well over 10 miles inland from Biscayne Bay; the entire park lies within the 100-year floodplain.

With the exception of the hardwood hammocks and built-up land on Convoy Point, Elliott Key, Adams Key, Boca Chita Key, and other scattered sites, almost all of the emergent land within park boundaries is classified as wetlands by the U.S. Fish and Wildlife Service.

### 3.2.2 *Environmental Consequences*

Water resource impacts were qualitatively assessed using professional judgment based on investigations of water resources, literature reviews, and information from the Park's 1995 Resource Management Plan.

#### 3.2.2.1 Alternative 1 (No Action)

Proposed activities with the potential to impact water resources include digging of hand lines; however, in light of the mitigation measures employed during fire management activities (*e.g.* no hand line construction in highly sensitive areas; no fire retardant use), there would be little, if any, direct impacts on surface water resources on the park. The potential for an increase in turbidity and sediment delivery in Biscayne Bay a result of soil erosion following suppression activities exists; however, as described under Section 3.1.2.1, the degree of soil erosion would be minor and localized. In addition, due to the flat topography, runoff of other materials (*e.g.* charred vegetative materials) would have no to negligible adverse impacts to the water quality of Biscayne Bay. Moreover, these activities would not involve the filling or disconnection of the floodplain or wetlands of the park, and would not affect their functionality.

#### 3.2.2.2 Alternative 2 (Preferred Alternative)

Under this alternative, impacts to water resources would be the same as those described in the "No Action" Alternative.

There would be no adverse impacts to water resources from the burning of debris piles. Debris piles would be small in scope (*e.g.* less than 10 feet in diameter), burned at island maintenance areas away from waterbodies, and during burning most of the vegetative material would be consumed leaving only ash. If any this ash was to reach the Biscayne Bay, it would have virtually no affect on its overall water quality.

### *Conclusion*

The general impacts to water quality among both alternatives would be similar in nature and very minor. The implementation of any of the alternatives would not impair water resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park's general management plan or other NPS planning documents.

## **3.3 VEGETATION**

### 3.3.1 *Affected Environment*

The primary terrestrial vegetation communities that occur at Biscayne Bay National Park are mangrove wetlands and hardwood hammocks.

- Mangrove Wetlands: Mangroves stretch along the 14 miles of shoreline comprising the mainland portion of the park, and also vegetate the park's keys to varying degrees (some of the lower elevation keys are completely covered by mangroves, while others are fringed along the bay side coastline or covered in lower elevation areas). Mangrove wetlands are extremely important to the ecology of subtropical coastal zone ecosystems. Mangroves inhabiting the park include red (*Rhizophora mangle*), white (*Laguncularia racemosa*), and black (*Avicennia germinans*).

With the exception of small, isolated patches of marsh grass, the mangrove wetlands at Biscayne lack embedded sawgrass or cordgrass prairies, and thus do not support wildland fire. Bob Panko, Fire Management Officer at nearby Everglades National Park, notes that lightning strikes that hit in these mangroves do not ignite fires, but rather create a small circle of deadened vegetation at the site of the strike (5/15/03 e-mail correspondence).

- Hardwood Hammocks: Subtropical hardwood hammocks cover the higher portions of many of the park's keys. Representative trees include West Indian mahogany (*Swietenia mahogani*), paradise tree (*Simarouba glauca*), geiger tree (*Cordia sebestena*), poisonwood (*Metopium toxiferum*), seagrape (*Coccoloba uvifera*), pigeon plum (*Coccoloba diversifolia*), gumbo limbo (*Bursera simaruba*), wild tamarind (*Lysiloma latisiliqua*), satin leaf (*Chrysophyllum oliviforme*), and ironwood (*Ostrya virginiana*). These are trees not typically found within the continental United States outside of south Florida, and belie the area's close relationship with the Caribbean.

While wildland fire is a necessary part of many different vegetative communities in Florida, the hardwood hammock is intolerant of fire. The sparse understory, dense shade of the canopy, and high humidity of a hammock helps to insulate it from fire. In very dry periods, however, hammocks become more vulnerable to wildland fire, and a major burn can completely destroy a hammock.

On those park keys with enough elevation to support hardwood hammocks, narrow strips of transitional vegetation communities generally occur between the coastline and the hammock. On the ocean side, where there is sand on or near the key's edge (particularly on the upper half of Elliott Key and on Boca Chita Key), the transition community includes seaside spurge (*Chamaesyce mesembryanthemifolia*), bay cedar (*Suriana maritima*), oxeye daisy (*Borrchia* spp.), cactus (*Opuntia* spp.), nickerbean (*Caesalpinia bonduc*), sea lavender (*Limonium latifolium*), black torch (*Erithalis fruticosa*), and in some cases, buttonwood (*Conocarpus erectus*). Where there is no sand on the ocean side, vegetation typically shifts from buttonwood along the coast to hardwood hammock.

Additional trees and shrubs that have been documented in the park include balsam apple/pond apple (*Clusia rosea*), coconut palm (*Cocos nucifera*), date palm (*Phoenix reclinata*), Florida cherry palm (*Pseudophoenix sargentii*), Florida thatch palm (*Thrinax radiata*), Key lime (*Citrus aurantifolia*), lemon (*Citrus limon*), monk orchid, (*Oeceoclades maculata*), sargent palm (*Pseudophoenix sargentii*), seven-year-apple (*Genipa clusiifolia*), silver palm (*Coccothrinax*

*argentata*), sour orange (*Citrus aurantium*), tangerine (*Citrus reticulata*), and wild banyantree (*Ficus citrifolia*). Many of these species were introduced and associated with 19<sup>th</sup> Century homestead sites.

Exotic plants and animals are those that occur in a given area as a result of direct and indirect deliberate or accidental introduction of the plant by humans. Exotics are not natural components of the ecosystems and have not evolved with the species native to the area. There are a number of exotic/introduced species in Biscayne National Park. The park has over 80 exotic plants identified within its boundaries. Of these, 14 are on the Florida Exotic Pest Plant Council's list of Florida's most invasive species, such as Brazilian pepper (*Schinus terebinthifolius*), Australian pine (*Casuarina equisetifolia*), sisal hemp (*Agave sisalana*) and seaside mahoe (*Thespesia populnea*), with the exception of species associated with significant archeological sites.

### 3.3.2 *Environmental Consequences*

Vegetation impacts were qualitatively assessed using presence/absence of plant species, literature reviews, and quantitatively assessed by acres impacted.

#### 3.3.2.1 Alternative 1 (No Action)

Proposed activities with the potential to impact vegetation include wildland fire suppression activities, such as digging of hand lines and removal of vegetation, and the maintenance of defensible spaces around park structures. Fire suppression and maintenance activities could result in the mortality of native plants and trees in the areas where wildland fire suppression or thinning is being taken place. The digging of hand lines and removal of trees and other woody vegetation are examples of wildland fire suppression that could cause the direct mortality of plant species. These impacts are expected to be minor because the loss of individual members of a given plant species, however, would not jeopardize the viability of the populations on and adjacent to the park and limited to the area of suppression. These impacts would be short-term, as native vegetation would be expected to recolonize after wildland fires had occurred. However, any fire suppression and maintenance activities that resulted in soil disturbance (e.g. building of fire lines, inadvertently denuding the soil of vegetation) would have minor impacts by making those areas more susceptible to the spread of invasive exotics that thrive in open disturbed areas. Disturbed areas would be monitored to guard against such infestations. Coupled with mitigation measures aimed at reducing soil damage, manual/mechanical-thinning activities would also help reduce the extent of existing invasive and exotic infestations in the park.

#### 3.3.2.2 Alternative 2 (Preferred Alternative)

Proposed activities with the potential to impact vegetation include wildland fire suppression activities, such as digging of hand lines and removal of vegetation, and the maintenance of defensible spaces around park structures. Impacts to vegetation under this alternative would be the same as those described in the "No Action" Alternative.



There would be no impact to vegetation from the burning of debris piles. Debris piles would be small in scope (*e.g.* less than 10 feet in diameter) and burned at island maintenance areas, where debris piles have been burned in the past, and no vegetation currently exists.

### *Conclusion*

Both alternatives would have minor adverse impacts to the native vegetation found within the park as a result of wildland fire suppression activities and maintenance of defensible spaces around park structures. The implementation of any of the alternatives would not impair vegetation resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park's general management plan or other NPS planning documents.

## **3.4 WILDLIFE**

### *3.4.1 Affected Environment*

The park encompasses a complex system of marine and terrestrial communities. As 95 percent of the park is water, the majority of its wildlife is associated with ocean or shoreline habitats. Examples of park fauna, some of which are Federally-listed threatened or endangered species, are provided below.

#### Aquafauna

- Marine Invertebrates: Biscayne Bay and the offshore reef tract or "Park Waters" is host to over 800 invertebrate species (Mulliken and VanArmen 1995), including shellfish such as shrimp (*Penaeus* spp.), crabs (*Portunus* and *Callinectes* spp.), and spiny lobster (*Panulirus argus*). Other invertebrate classes include annelid worms (Polychaeta), crustaceans (Crustacea), chitons (Amphineura), snails and slugs (Gastropoda), mussels, scallops, and oysters (Pteriomorphia), and echinoderms (Echinoidea, Holothuroidea, and Ophiuroidea).
- Fish: Biscayne Bay serves as a nursery area for larvae and juveniles of a wide variety of fish (Ault et al. 2001). Many species of these early development stage fish live and reproduce in the adjacent barrier coral reef and other offshore habitats as adults.

Biscayne Bay is also a transition area for the fishes of eastern Florida, with a population of tropical and temperate water fishes. Studies have identified at least 512 fish species in Biscayne Bay (Mulliken and VanArmen 1995). Fish species documented in park waters include barracuda (*Sphyraena barracuda*), Atlantic stingray (*Dasyatis sabina*), damselfish (*Pomacentrus* spp.), mackerel (*Scomberomorus* spp.), mullet (*Mugil* spp.), pompano (*Trachinotus carolinus*), hogfish (*Lachnolaimus maximus*), tarpon (*Megalops atlanticus*), snook (*Centromus* spp.), as well as many members of fish families such as snappers (Lutjanidae), groupers (Serranidae), grunts (Haemulidae), spadefish

(Ehippidae), surgeonfish (Acanthuridae), triggerfish (Balistidae), parrotfish (Scaridae), and jacks (Carangidae).

The Florida Audubon is currently conducting a freshwater fish inventory of canals within mainland park boundaries and ephemeral ponds on park keys. A cryptic marine fish inventory is scheduled to begin in 2004 / 2005.

- Marine mammals: Marine mammals documented to occur in park waters include the Atlantic bottlenose dolphin (*Tursiops truncatus*), finback whale (*Balaenoptera physalus*), humpback whale (*Megaptera novaengliae*), right whale (*Balaena glacialis*), Sei whale (*Balaenoptera borealis*), sperm whale (*Physeter macrocephalus*), and West Indian manatee (*Trichechus manatus*).
- Marine reptiles: Marine reptiles documented to occur in park waters include the loggerhead sea turtle (*Caretta caretta*), Atlantic green turtle (*Chelonia mydas*), leatherback sea turtle (*Dermochelys coriacea*), Atlantic hawksbill sea turtle (*Erectmochelys imbricata*), and Kemp's ridley sea turtle (*Lepidochelys kempii*).

### Terrestrial Fauna

- Mammals: Mammals documented to occur at the park include the bobcat (*Lynx rufus*), gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), Seminole bat (*Lasiurus seminolus*), Brazilian free-tailed bat (*Tadarida brasiliensis*), Wagner's mastiff-bat (*Eumops glaucinus*), black rat (*Rattus rattus*), and marsh rabbit (*Sylvilagus palustris*).

Researchers at the University of Florida recently completed a small- and medium-size mammal inventory at the park, and has provided the park with a draft report of its findings. Fly By Night Incorporated recently completed a bat inventory at the park and is presently completing a report of its findings.

- Reptiles and Amphibians: Reptiles documented to occur at the park include the American alligator (*Alligator mississippiensis*), American crocodile (*Crocodylus acutus*), reef gecko (*Sphaerodactylus notatus*), green anole (*Anolis carolinensis*), ground skink (*Scincella lateralis*), mole skink (*Eumeces egregius*), Florida box turtle (*Terrapene carolina bauri*), striped mud turtle (*Kinosternon baurii*), black swamp snake (*Seminatrix pygaea*), corn snake (*Elaphe guttata*), dusky pigmy rattlesnake (*Sistrurus miliarius barbouri*), eastern diamondback rattlesnake (*Crotalus adamanteus*), eastern indigo snake (*Drymarchon corais couperi*), Everglades racer (*Coluber constrictor paludicola*), Everglades rat snake (*Elaphe obsoleta rossalleni*), mangrove diamondback (*Malaclemys terrapin rhizophorarum*), northern coral snake (*Micrurus fulvius*), and yellow rat snake (*Elaphe obsoleta quadrivittata*). Amphibians documented to occur at the park include the Cuban tree frog (*Osteopilus septentrionalis*), greenhouse frog (*Eleutherodactylus planirostris*), green tree frog (*Hyla cinerea*), squirrel tree frog (*Hyla squirella*), southern toad (*Bufo terrestris*), and eastern narrowmouth toad (*Gastrophryne carolinensis*).

The U.S. Geological Survey recently completed a herpetofaunal inventory at the park, and is presently completing a report of its findings.

- **Avifauna:** Birds at Biscayne include permanent resident species, as well as winter or summer migrants. Species documented to occur at the park include the black-whiskered vireo (*Vireo altiloquus*), royal tern (*Sterna maxima*), Caspian tern (*Sterna caspia*), American kestrel (*Falco sparverius*), Cooper's hawk (*Accipiter cooperii*), broad-winged hawk (*Buteo platypterus*), osprey (*Pandion haliaetus*), northern harrier (*Circus cyaneus*), eastern screech owl (*Otus asio*), double-crested cormorant (*Phalacrocorax auritus*), herring gull (*Larus argentatus*), belted kingfisher (*Ceryle alcyon*), black-bellied plover (*Pluvialis squatarola*), gray catbird (*Dumetella carolinensis*), great blue heron (*Ardea herodias*), green heron (*Butorides virescens*), glossy ibis (*Plegadis falcinellus*), fulvous whistling-duck (*Dendrocygna bicolor*), red-breasted merganser (*Mergus serrator*), Louisiana waterthrush (*Seiurus motacilla*), magnolia warbler (*Dendroica magnolia*), palm warbler (*Dendroica palmarum*), mangrove cuckoo (*Coccyzus minor*), red-bellied woodpecker (*Melanerpes carolinus*), and Key West quail dove (*Geotrygon chrysia*).

There are many species of animals protected within Biscayne National Park that have been listed by the Federal government as Endangered or Threatened.

Table 3-1 Federally Listed Endangered and Threatened Species of Biscayne National Park

Reptiles	Scientific Name	Habitat	Status
American alligator	<i>Alligator mississippiensis</i>	Swamps, marshes, lakes, and drainage canals	Threatened
American crocodile	<i>Crocodylus acutus</i>	Brackish coastal habitats (including tidal estuaries, coastal lagoons and mangrove swamps)	Endangered
Atlantic green sea turtle <sup>1</sup>	<i>Chelonia mydas</i>	Mostly Aquatic, beaches used for breeding	Endangered
Atlantic hawksbill sea turtle <sup>1</sup>	<i>Eretmochelys imbricata</i>	Mostly Aquatic, beaches used for breeding	Endangered
Eastern indigo snake	<i>Drymarchon corais couperi</i>	Shrub Habitat	Threatened
Kemp's Ridley sea turtle <sup>1</sup>	<i>Lepidochelys kempii</i>	Mostly Aquatic, beaches used for breeding	Endangered
Leatherback sea turtle <sup>1</sup>	<i>Dermochelys coriacea</i>	Mostly Aquatic, beaches used for breeding	Endangered
Loggerhead sea turtle <sup>1</sup>	<i>Caretta caretta</i>	Mostly Aquatic, beaches used for breeding	Threatened
Green sea turtle <sup>1</sup>	<i>Chelonia mydas</i>	Mostly Aquatic, beaches used for breeding	Endangered
Hawksbill sea turtle <sup>1</sup>	<i>Eretmochelys imbricata</i>	Mostly Aquatic, beaches used for breeding	Endangered
<b>Fish</b>	<b>Scientific Name</b>		
Smalltooth sawfish <sup>1</sup>	<i>Pristis pectinata</i>	Aquatic	Endangered
<b>Birds</b>	<b>Scientific Name</b>	<b>Habitat</b>	
Bald eagle	<i>Haliaeetus leucocephalus</i>	Coastal	Threatened
Least tern	<i>Sterna antillarum</i>	Sandbars	Endangered
Piping Plover	<i>Charadrius melodus</i>	Coastal beaches	Threatened
Wood stork	<i>Mycteria americana</i>	Coastal salt marshes and mangrove swamps	Endangered
<b>Mammals</b>	<b>Scientific Name</b>	<b>Habitat</b>	
Finback whale <sup>1</sup>	<i>Balaenoptera physalus</i>	Aquatic	Endangered
Humpback whale <sup>1</sup>	<i>Megaptera novaengliae</i>	Aquatic	Endangered
Key Largo woodrat	<i>Neotoma floridana smalli</i>	Aquatic	Endangered
Key Largo cotton mouse	<i>Peromyscus gossypinus allapaticola</i>	Aquatic	Endangered
Right whale <sup>1</sup>	<i>Balaena glacialis</i>	Aquatic	Endangered
Sei whale <sup>1</sup>	<i>Balaenoptera borealis</i>	Aquatic	Endangered
Sperm whale <sup>1</sup>	<i>Physeter macrocephalus</i>	Aquatic	Endangered

West Indian Manatee <sup>1</sup>	<i>Trichechus manatus</i>	Aquatic	Endangered
<b>Other</b>	<b>Scientific Name</b>	<b>Habitat</b>	
Schaus Swallowtail Butterfly	<i>Herclides aristodemus ponceanus</i>	Tropical hardwood hammocks and neighboring scrub areas	Endangered
Staghorn coral <sup>1</sup>	<i>Acropora cervicornis</i>	Aquatic	Candidate taxon, ready for proposal
Elkhorn coral <sup>1</sup>	<i>Acropora palmata</i>	Aquatic	Candidate taxon, ready for proposal
<sup>1</sup> Habitat utilized by these species will not be affected by fire management activities and therefore will not be analyzed further			

### 3.4.2 Environmental Consequences

The effects of the alternatives on wildlife were qualitatively assessed using professional judgment based on literature reviews, general knowledge, and research specific to the area.

#### 3.4.2.1 Alternative 1 (No Action)

Proposed activities with the potential to impact wildlife include wildland fire suppression activities such as digging of hand lines and removal of vegetation, and maintenance of defensible space.

All the fire suppression activities could result in the temporary displacement of wildlife or individual mortality of wildlife species. These impacts would be minor because the loss of individuals of a non-threatened or endangered species, however, would not jeopardize the viability of the populations on and adjacent to the park.

Wildland fire suppression would likely not adversely affect any of the Federally listed threatened or endangered species found within the park. As detailed in section 2.3, (Mitigation and Monitoring), whenever possible, fire suppression activities would avoid ground disturbance within known natural sites (e.g. critical habitat, known areas where T&E species exist, known denning sites). When a wildland fire suppression activity (e.g. hand line construction) is not discretionary and deemed necessary to protect human life or property in or around these resource locations, it would involve as little ground disturbance as possible and be located as far outside of resource boundaries as possible.

There would be no impacts to any of the Federally listed species found within the park from fire management activities such as defensible space maintenance. As stated in the National Park System's 2001 Management Policies, if a Federally or state listed species were to be documented within the park boundaries, active management programs would be undertaken to inventory, monitor, restore, and maintain the listed species' habitats, control detrimental non-native species, control detrimental visitor access, and re-establish extirpated populations as necessary to maintain the species and habitats upon which they depend. The Park would also manage designated critical habitat, essential habitat, and recovery areas to maintain and enhance their value for the recovery of threatened and endangered species. Measures taken to protect those

species, or their required habitat, would supersede any management activities outlined in the FMP in the event any of those management activities would negatively impact the listed species.

Aquatic species in the park would not be affected by hand line construction use since these activities would not be conducted within 100 feet of surface water resources. Additionally, these activities would not result in significant amounts of soil erosion and sediment delivery to any of the surface waters of the park, which could impact aquatic habitats.

#### 3.4.2.2 Alternative 2 (Preferred Alternative)

Proposed activities with the potential to impact wildlife include wildland fire suppression activities and maintenance of defensible spaces around park structures. General impacts to wildlife during these activities would be the same as described in the “No Action” Alternative.

There would be no adverse impacts to wildlife from the burning of debris piles. Debris piles would be small in scope (*e.g.* less than 10 feet in diameter) and burned at island maintenance areas. There is a lot of activity in these areas, which results in minimal wildlife use.

Consultation with the Florida Fish and Wildlife Conservation Commission and the U.S. Fish and Wildlife Service (See Appendix A) concurred with the opinion that actions proposed in the Fire Management Plan would not likely affect any of the State or Federally listed species found in and around the park.

#### *Conclusion*

Fire management activities from both alternatives could temporary displace some wildlife species and increase the possibility of individual mortality of some species. The implementation of any of the alternatives would not impair wildlife resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park’s general management plan or other NPS planning documents.

## 3.5 AIR QUALITY

### 3.5.1 *Affected Environment*

The region of south Florida including the park is designated a class II air shed under the 1977 amendments to the Clean Air Act. Under class II, modest increases in air pollution are allowed beyond baseline levels for particulate matter, sulfur dioxide, nitrogen and nitrogen dioxide, provided that the national ambient air quality standards, established by the Environmental Protection Agency (EPA), are not exceeded.

Miami is the major source of pollutants in Dade County and the park. Its primary pollutants are total suspended particulates and ozone. The levels of nitrogen dioxide, carbon monoxide, and sulfur dioxide produced in the city do not appear to significantly influence the park’s air. Occasionally, during early morning temperature inversions, pollution from Miami reduces

visibility over Biscayne Bay. Low-flying military aircraft using Homestead Air Force Base frequently pass over the park and may affect air quality.

There are no major air pollution sources within the park. Motorboat exhaust is the most common pollutant resulting from visitor use and management activities.

### *3.5.2 Environmental Consequences*

Air quality impacts were qualitatively assessed using literature reviews and professional judgment based on consideration of fuel levels and types, size of area that could burn, and knowledge of air chemistry.

#### 3.5.2.1 Alternative 1 (No Action)

There would be no air quality impacts under the “No Action” Alternative.

#### 3.5.2.2 Alternative 2

Proposed activities with the potential to impact air quality include the burning of debris piles. The periodic burning of debris piles for maintenance purposes would have only very minor impacts on air quality. Considering the relatively small area that would be affected by debris burning in any given year, debris burning would not violate daily national or state emission standards and would cause very minor and temporary air quality impacts.

### *Conclusion*

The “No Action” Alternative would not have any impacts on air quality, while alternative 2 would have only very minor and temporary impacts resulting from prescribed fires. The implementation of any of the alternatives would not impair air quality resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park’s general management plan or other NPS planning documents.

## **3.6 VISITOR USE AND EXPERIENCE (INCLUDING PARK OPERATIONS)**

### *3.6.1 Affected Environment*

The rapid urbanization of the South Florida area since the Park’s establishment has made Biscayne an urban park. This growth is reflected in a commensurate increase in the use of the Park, and resulted in a tremendous increase in the potential threat to the natural and cultural resources. Biscayne has easy access from an infinite number of directions, and most activities within the Park are boating related. Park waters are used by recreational boaters, anglers, divers, and snorkelers. The Park contains two major channels, the Intracoastal Waterway (ICW) and Hawk Channel, which are utilized by large pleasure craft. There are two marinas within the

boundaries of the Park, and several others just outside the boundaries on Key Biscayne and in Miami.

Biscayne National Park is visited by approximately 500,000 visitors a year. Activities enjoyed include fishing, swimming, snorkeling, boating, sunbathing, photography, wildlife viewing, and camping. In 2003, over 510,000 people visited the park and in 2002, almost 490,000 people visited the park. Historically, fall and winter visitation to the park has accounted for approximately 45% of total visitation, with spring and summer visitation accounting for the remaining 55%.

The Park contains several developed visitor areas. Convoy Point contains the park headquarters and visitor center. This area includes staff housing; a maintenance and storage area; temporary storage sheds; a field laboratory and dive locker; a picnic area with tables, grills, and restrooms; park and public boat basins; docks; and a park boat ramp. Boca Chita Key includes a boat dock, picnic area, restrooms, and primitive camping area. Another visitor center (ranger station) is located at Elliott Key with a restroom facility connected by a wooden boardwalk, two staff housing units, a maintenance complex, a maintenance dock, two public boat docks (Elliott Key Harbor and University Dock), a campground with picnic tables and grills, and walking trails. Adams Key include staff housing, a public boat dock, a picnic area with a pavilion, restrooms, a cistern for collecting drinking water, a generator shed, and walking trail.

### *3.6.2 Environmental Consequences*

Recreation impacts were qualitatively assessed in light of the intensity and duration of fire management activities as they related to visitor use and experience. Visual resource impacts in this environmental assessment were assessed in terms of scenic integrity, visual wholeness, and unity of the landscape.

#### *3.6.2.1 Alternative 1 (No Action)*

There would be some short-term reduction in scenic integrity and visitor use and experience during and immediately following wildfire suppression activities from the presence of fire crews. Short-term reduction in scenic integrity, however, would be minor because fire management activities would likely involve only short-term presence of people, and any vegetation cut, would be cut flush with the ground.

In the event of a wildfire within or adjacent to the park, park operations could be temporarily affected depending on the severity of the fire and situation at hand as visitors and non-essential park personnel were evacuated to off-site and safe locations.

#### *3.6.2.2 Alternative 2 (Preferred Alternative)*

Under this alternative, visitor use and experience impacts would be similar to those described under the “No Action” Alternative with regards to wildland fire suppression. Impacts resulting from the burning of debris piles to visitor use and experience would be minor and short-term. The scenic integrity of the park for some visitors could be temporarily altered if in the general

vicinity of a debris burn. Smoke from the burn, charred surface of old fires, and presence of maintenance personnel could all influence the visitors experience adversely.

### *Conclusion*

Negative impacts to the park, under both alternatives, would be very minor and temporary during suppression activities (e.g. trail closures or limited access to certain areas, presence of work crews in the vista).

## **3.7 HUMAN HEALTH AND SAFETY**

### *3.7.1 Affected Environment*

In the event of potentially hazardous wildfires within the park, the Park Superintendent and Chief of Operations would currently and in the future coordinate public notification efforts within and outside the park. The extent of public notice would depend on the specific fire situation. In every case, assuring visitor and park staff safety would take priority over other activities.

- Only fully qualified (i.e. meeting NPS qualifications and accepted interagency knowledge, skills and abilities for the assigned fire job) employees will be assigned fire management duties (unless assigned as trainees, in which case they will be closely supervised by an individual fully qualified for the given position).
- No fire management operation will be initiated until all personnel involved have received a safety briefing describing known hazards and mitigating actions (LCES), current fire season conditions, and current and predicted fire weather and behavior. Hazards specific to the park include:
  - Lightning
  - Snags and dead trees with weak root systems
  - Stinging/biting insects, ticks, and poisonous snakes
  - Dehydration, heat exhaustion and heat stroke
- Wildland fire incident commanders will minimize firefighter exposure to heavy smoke by incorporating the recommendations outlined in the publication *Health Hazards of Smoke* (Sharkey 1997), available from the Missoula Technology and Development Center.
- Park neighbors, visitors and local residents will be notified of all fire management events that have the potential to impact them.
- The park superintendent or designee may, as a safety precaution, temporarily close parts of the park to the visiting public.



- Smoke on roadways will be monitored and traffic control provisions taken to ensure motorist safety during fire events at the park. The following procedures will be taken to compensate for reduced visibility when a paved road is affected by smoke (the incident commander on a particular event will determine visibility levels):
- Posting of “Smoke on Road” signs on either side of the affected area.
- Reducing the posted speed limit when visibility is strongly reduced and escorting vehicles with a well-marked law enforcement vehicle as necessary.
- Closing the road to traffic when visibility is severely reduced.

### 3.7.2 *Environmental Consequences*

Human health & safety impacts were qualitatively assessed through determination of activities, equipment and conditions that could result in injury, literature review of type and extent of injury caused by equipment and conditions, and in light of mitigation measures and best management practices.

#### 3.7.2.1 Alternative 1 (No Action)

Factors most likely to adversely impact firefighter health and safety include activities associated with wildland fire suppression efforts (e.g. injuries from the use of fire-fighting equipment, smoke inhalation, and, in severe cases, injuries from wildland fires). Impacts to the public could include smoke inhalation, and in severe cases, injuries from wildland fires.

Hand line construction can pose safety threats to firefighters. While each of the crew is trained in the use of firefighting equipment, accidental injuries may occur from time to time. Strict adherence to guidelines concerning firefighter accreditation, and equipment and procedure safety guidelines would minimize accidents.

Smoke inhalation can also pose a threat to human health & safety. Smoke from wildland fires is composed of hundreds of chemicals in gaseous, liquid, and solid forms. The chief inhalation hazard appears to be carbon monoxide (CO), aldehydes, respirable particulate matter with a median diameter of 2.5 micrometers (PM<sub>2.5</sub>), and total suspended particulate (TSP). Adverse health effects of smoke exposure begin with acute, instantaneous eye and respiratory irritation and shortness of breath, but can develop into headaches, dizziness, and nausea lasting up to several hours. Based on a recent study of firefighter smoke exposure, most smoke exposures were not considered hazardous, but a small percentage routinely exceeded recommended exposure limits for carbon monoxide and respiratory irritants (USDA, 2000).

#### 3.7.2.2 Alternative 2 (Preferred Alternative)

The general impacts to human health & safety under Alternative 2 would be similar to those described under the No Action Alternative.

Impacts to human health and safety resulting from debris burning include small cuts and scratches, burns, and smoke inhalation. However, in light of mitigation measures taken to protect maintenance personnel from these potential injuries (e.g. wearing protective clothing, obtaining all needed permits, and developing an appropriate safety and evacuation plan in case of injuries or other emergencies) the chance of these injuries occurring would be minimized.

### *Conclusion*

Under both alternatives there is the potential for injury to workers from suppressing wildfires. Under alternatives 2 the potential for minor exposure to smoke and other injuries by park personnel during debris burning is slightly increased.

## **3.8 CULTURAL RESOURCES**

Section 106 of the National Historic Preservation Act requires Federal agencies to consider the effects of their proposals on historic properties, and to provide state historic preservation officers, tribal historic preservation officers, and, as necessary, the Advisory Council on Historic Preservation a reasonable opportunity to review and comment on these actions. The consultation process with the Florida Department of State: Division of Historical Resources was initiated in 2004. Letters and comments from the Florida Division of Historical Resources can be found in Appendix A.

### *3.8.1 Affected Environment*

Cultural resources at the park include prehistoric sites that provide evidence of aboriginal settlement of the Biscayne Bay region; historic shipwrecks; submerged historic non-shipwreck sites (e.g. docks, ballast piles, navigation aids, etc.); archeological ruins related to nineteenth- and early-twentieth-century homesteading and pioneer settlements; and the buildings and structures from development of the Miami area as a vacation destination during the first half of the twentieth century.

Current knowledge regarding the location and distribution of Biscayne's archeological deposits are based on dated and incomplete terrestrial and hydrographic surveys. It is highly probable that many more significant sites will be identified in the future once park survey coverage is complete, pending archeological investigations center on identifying the remains of the 1890 homestead of Annie E. Higgs and the documented existence of an 1837 Black Seminole village. The latter site is located in the vicinity of Black Point, and its inhabitants may have been involved in the Underground Railroad.

Park properties currently listed on the National Register of Historic Places (NRHP) are Offshore Reefs Archaeological District (1981), Sweeting Homestead Site (1997), and Boca Chita Key Historic District (1997). Since the establishment of the NRHP listings, new archeological sites have been identified. The Jones Property and the Totten Key Native American Complex are deemed to be significant by NRHP standards, and/or to the park's mission, "to preserve and enhance the unique combination of land, water, wildlife and historic elements of Biscayne National Park for the education, inspiration, and recreation of present and future generations."

Native American Sites: Archeological evidence that the earliest aboriginal inhabitants of the South Florida Peninsula visited the Biscayne Bay area 10,000 BP (Before Present) is found along upland areas adjacent to current park boundaries. At that time, Biscayne basin was a freshwater marsh or lake. Around 4,000 BP, the rise in sea level inundated Biscayne basin with seawater and created the keys that we see today. The inundation of the ancient coastline likely obscures the material remains of the Native Americans that inhabited the park during the Paleolithic (12,000 - 9,500 BP) and Archaic (9,500 - 2,500 BP) periods. Identified Native American sites in the park span the entire Formative period (2,500 BP - ~500 BP) portraying intensive, long-term settlements that reflect the pre-Columbian connection between humans and marine resources.

South Florida archaeologists distinguish Formative period remains as Glades I (2,500 - 1,250 BP), Glades II (1,250 - 800 BP) and Glades III (800 BP - 1513 AD). In 1513, Juan Ponce de Leon referred to Glades III Native Americans inhabiting the Miami area as the Tequesta. Glades sites are reflected in four shell middens located on keys within park boundaries. A notable Glades site, the Totten Key Complex, consists of a shell midden, an earthen midden and a rock mound. During the eighteenth century, the Miccosukee and Seminole began colonizing South Florida. Historians have noted a strong Seminole presence in northern Biscayne Bay during the late-nineteenth century; however their relationship to the marine resources of the park is only now being investigated.

Historic Homesteading and Pioneering Sites: Euro-American settlement of the park's keys began in 1871 with the completion of the government survey driven by the Homestead Act of 1862. Historical documents indicate that all six homesteading families that settled on Elliott Key prior to the development of Miami supplemented their plantation income by fishing, turtling, sponging, and wrecking. The Sweeting Homestead site is deemed significant for the information it is likely to yield about the early settlement of the keys. The development of Miami had a tremendous impact on the lives of early settlers. The household remains of Israel Lafayette Jones, an African American who purchased Porgy Key in 1898, reflect this period of transition.

Historic Resort Development: With the exception of the Fowey Rocks Lighthouse, an offshore 1877 historic structure currently owned and operated by the United States Coast Guard, all surviving park architectural resources are located within Boca Chita Key Historic District. Built between 1937 and 1940 as a private resort/summer retreat for the wealthy Mark C. Honeywell, the NRHP district is significant for its architectural style and its association with the recreational development of Miami. Contributing properties to the district consist of three buildings, eight structures, and one object (a cannon).

The Cocolobo Club was another private resort built in the early-twentieth century. All of the facilities on the key, including the still-standing Cocolobo buildings, were totally destroyed in 1992 by Hurricane Andrew, which passed almost directly over Adams Key.

### 3.8.2 *Environmental Consequences*

Cultural resource impacts were qualitatively assessed through a presence/absence determination of significant cultural resources and mitigation measures to be employed during wildfire suppression, thinning, and prescribed fire activities.

#### 3.8.2.1 Alternative 1 (No Action)

Proposed activities with the potential to impact known and unknown cultural resources include wildland fire suppression activities such as the digging of hand lines. Under this alternative the park would protect cultural resources by implementing the following fire management practices:

- The park resource management specialist will coordinate with the Southeast Archeological Center to ensure that the Park has the most current data regarding archeological resources within its boundaries. S/he will provide recommendations on how to mitigate adverse effects to these resources during fire management activities, and will coordinate compliance with Section 106 of the National Historic Preservation Act, as appropriate.
- Park structures will be protected from wildland fire via defensible space around each (a minimum of 30 feet around each).
- During all fire suppression activities, the minimum impact tactics policy (see section 4.2.7) will be incorporated to the greatest extent feasible and appropriate for the given situation. Tactics directly or indirectly facilitating the protection of cultural resources include:
  - Keeping fire engines on existing roads.
  - Restricting heavy equipment for constructing fireline. A bulldozer or plow may be used for fireline construction only in extreme situations to protect human life and property, and then only with the authorization of the park superintendent or designee. Plow lines will be kept as shallow as possible, and will undergo archeological investigation as soon as possible after the event.
  - Using existing firebreaks and natural fuel breaks and human-made barriers, wet line, or cold trailing the fire edge in lieu of fireline construction whenever possible.
  - Avoiding ground disturbance within known archeological/cultural/historic resource locations. When fireline construction is necessary in proximity to these resource locations it will involve as little ground disturbance as possible and be located as far outside of resource boundaries as possible.
  - When using water to suppress wildland fires, using soaker hose, sprinklers or foggers in mop-up to avoid boring and hydraulic action.

There would be the slight potential for fire suppression activities to affect unrecorded or unknown archeological or cultural resources within the park.

### 3.8.2.2 Alternative 2 (Preferred Alternative)

General impacts to cultural resource sites under Alternative 2 would be similar to those described under the “No Action” Alternative.

There would be no adverse impacts to cultural resources of the park from the burning of debris piles at the park’s maintenance facilities. The burn piles are small in scope and far enough away from any of the park’s cultural resources that there would be no adverse impacts from what little smoke would be produced.

Consultation with the Florida Department of State: Division of Historic Resources initiated on April 20, 2004 concurred in the opinion that actions proposed in the Fire Management Plan would not likely affect any of the cultural resources of Biscayne National Park.

#### *Conclusion*

The cultural resources of the park would be benefited equally under both alternatives by utilizing minimum impact suppression tactics during the suppression of wildland fires at the park.

The implementation of any of the alternatives would not impair cultural resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park’s general management plan or other NPS planning documents.

## **3.9 CUMULATIVE IMPACTS**

The cumulative impacts analysis for the Fire Management Plan environmental assessment considers the past, present, and reasonably foreseeable future actions on land uses that could add to (intensify) or offset (compensate for) the effects on the resources and that may be affected by the fire Management Plan alternatives. Cumulative impacts vary by resource and the geographic areas considered here are generally the park and areas adjacent to the park. In some instances, activities may result in both negative and positive impacts when considering the short and long-terms. As a result, some resource categories in Table 3-2 show both positive and negative impacts resulting from a particular activity. The information provided in Table 3-2 is the basis for the cumulative impacts described in Table 3-3.

Table 3-2 Affected Impact Topics and Activities/Land Uses  
Contributing to Fire Management Plan Cumulative Impacts

	Soils	Water Resources	Vegetation	Wildlife	Air Quality	Visitor Use & Experience	Human Health & Safety	Cultural Resources
Proposed land acquisitions to include the Miami Circle and Virginia Key Beach	+	+	+	+		+		+
Past land acquisition in the park's authorized boundary	+	+	+	+		+		+
Development of an Exotic Plant Management Plan			+	+		+		
Future introduction of the Miami blue butterfly ( <i>cyclargus thomasi bethunebakeri</i> )				+		+		
Future increase in Visitor use as population of South Florida Increases (e.g. increased boat traffic)				-	-	-		
Past, current, and future commercial development near the park		-		-	-	-	+	-

**DIRECT/INDIRECT EFFECTS KEY: (+) Positive/beneficial; (-) Negative/detrimental; (Blank) Neutral/no effect**

Table 3-3 Cumulative Impacts

Resource	Impacts from Past and Present Activities/Land Uses	Impacts from Future Activities/Land Uses	Impacts from Proposed Actions (No Action, Alternatives 2 (Preferred))	Cumulative Impacts from Proposed Actions
<b>Soils</b>	Beneficial soil impact as ecological function is restored on lands acquired for inclusion to the park	Beneficial soil impact as ecological function is protected from future development on lands acquired for inclusion to the park	Wildland fire suppression activities would have temporary and minor adverse effects on soils (soil erosion); debris burning as detailed in the park's Preferred Alternative would have very minor, if any, localized impacts to soil	Fire Management Plan would not result in significant cumulative impacts to the quality of the soils found at Biscayne National Park
<b>Water Resources</b>	Moderate adverse impacts to water quality from past and current residential and commercial development adjacent to the park (turbidity, sediment delivery, pollution, water consumption); beneficial impact to water resources is restored on lands acquired for inclusion to the park	Increased development in areas adjacent to the park would directly and indirectly impact water resources (turbidity, sediment delivery, pollution, water consumption); Future Beneficial watershed impacts as ecological function is restored on lands acquired for inclusion to the park	Wildland fire suppression activities would have no direct impacts on water resources, and only minor indirect impacts (turbidity and sediment delivery from soil erosion)	Fire Management Plan would not result in significant cumulative effects on water resources; any impacts to water quality would be minor and not add to those impacts already affecting the water quality of the park
<b>Vegetation</b>	Past and current land acquisition preserves vegetation communities (e.g. hardwood hammocks and mangroves)	Future land acquisition preserves vegetation communities; future implementation of Exotic Plant Management Plan benefits native plant communities	Wildland fire suppression and maintenance activities could result in the mortality of native plants and trees in the areas where wildland fire suppression or maintenance is being taken place. These impacts are expected to be minor because the loss of individual members of a given plant species, however, would not jeopardize the viability of the populations on and adjacent to the park and limited to the area of suppression. soil disturbance from these activities could result increased occurrence of invasive exotic species	Given that wildland fires are such a rare event within the park, coupled with the fact that if it were to occur minimum impacts suppression tactics would be used and that the vegetative communities are not fire dependant, the Fire Management Plan would not result in significant cumulative impacts
<b>Wildlife</b>	Past and current land acquisition preserve wildlife habitat and promote diversity; past and current development adjacent to the park reduce wildlife habitat and fragment wildlife corridors and edge habitat	Future development adjacent to the park would destroy and fragment wildlife habitat; introduction of the Miami Blue Butterfly beneficial to species and ecosystem; future land acquisition would preserve wildlife habitat and promote diversity; future increase in visitor use disrupts wildlife; future exotic plant management plan benefits native plant communities, which benefits native fauna	Wildland fire suppression and maintenance activities could result in minor, short-term disturbance and displacement with minimal loss of non-listed species; proposed actions not likely to adversely affect any state or Federally listed species	Given that wildland fires are such a rare event within the park, coupled with the fact that if it were to occur minimum impacts suppression tactics would be used and that the ecosystem is not fire dependant Fire Management Plan would not result in significant cumulative impacts

Table 3-3 Cumulative Impacts

Resource	Impacts from Past and Present Activities/Land Uses	Impacts from Future Activities/Land Uses	Impacts from Proposed Actions (No Action, Alternatives 2 (Preferred))	Cumulative Impacts from Proposed Actions
<b>Air Quality</b>	Commercial and Industrial practices emit pollutants and particulate matter; automobiles on and off the park contribute to some temporary deterioration in air quality and visibility	Future increase in visitor use would bring more cars and boats into the park adversely impacting air quality	Debris burning would result in very minor, short-term air quality impacts	Class II air quality standards would not be violated; Fire Management Plan would not result in significant cumulative impacts; the “Preferred” Alternative would contribute the most to air quality cumulative impacts through its debris burning
<b>Visitor Use and Experience (including Park Operations)</b>	Past and current land acquisition provides additional recreational opportunities for the visitor; past and current development adjacent to the park degrades natural and historic vistas	Future land acquisition enhances visitor use and experience; future residential and commercial development near the park degrade the cultural landscape and degrade visitor use and experience; future increases in visitor use would degrade overall experience for the individual	Wildland fire suppression and maintenance activities could result in minor and short-term visitor use and experience impacts; park operations could be impacted if wildland fire were to occur at the park	Fire Management Plan would not result in significant cumulative impacts
<b>Human Health &amp; Safety</b>	Past and current development improves human health and safety in areas outside the park boundaries.	Similar effects as described in past and present activities/land uses; increased visitor use increases both boat and auto traffic increasing possibility for accidents	Wildland fire suppression, debris burning, and maintenance activities may result in very minor impacts (smoke inhalation, cuts and bruises)	Increased visitor use could potentially increase the occurrence of a wildland fire, Fire Management Plan would not result in significant cumulative impacts
<b>Cultural Resources</b>	Past and current land acquisition preserves the cultural and historical resources of the park; residential and commercial development degrade historic vistas	Similar effects as described in past and present activities/land uses	Wildland fire suppression and maintenance of defensible spaces around park structures would help preserve and protect the cultural resources of the park from wildland fire	Fire Management Plan would not result in significant cumulative impacts, both would equally protect the cultural resources of the park



## **Consultation and Coordination**

### **List of Preparers**

Joel Gorder, Project Manager, Mangi Environmental Group  
Charles Grier, Environmental Analyst, Mangi Environmental Group

### **Persons, Organizations, and Agencies Consulted**

U.S. Fish and Wildlife Service  
Florida Department of State: Division of Historic Conservation  
Florida Fish and Wildlife Conservation Commission  
Rick Clark, Chief of Resources Management, Biscayne National Park  
Jami Hammond, Southeast Regional Office, National Park Service  
Robin Toole, Southeast Regional Office, National Park Service  
Todd Kellison, Fishery Biologist, Biscayne National Park

### **Persons, Organizations, and Agencies Who Received this Environmental Assessment**

U.S. Fish and Wildlife Service  
Florida Department of State: Division of Historic Conservation  
Florida Fish and Wildlife Conservation Commission  
Miccosukee Tribe of Indians of Florida  
Seminole Tribe of Florida

### **Scoping**

Details of the scoping process and the issues that arose from it are described in Chapter 1, Section 1.5 – *Scoping Issues and Impact Topics*.

### References Cited

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## **APPENDIX A**

### **CONSULTATIONS WITH U.S. FISH AND WILDLIFE SERVICE, FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION, AND THE FLORIDA DEPARTMENT OF STATE: DIVISION OF HISTORICAL RESOURCES**



## United States Department of the Interior

FISH AND WILDLIFE SERVICE  
South Florida Ecological Services Office  
1339 20<sup>th</sup> Street  
Vero Beach, Florida 32960



August 12, 2004

### Memorandum

To: Robin Toole, Regional Fire Planner, National Park Service

From: James J. Slack, Field Supervisor, South Florida Ecological Services Office  
*James J. Slack*

Subject: Section 7 Consultation for Implementation of the Biscayne National Park Fire Management Plan, Service Log Number 4-1-04-I-5031

The Fish and Wildlife Service (Service) has reviewed the Environmental Assessment (EA), Fire Management Plan (FMP), and maps submitted by the National Park Service (NPS) for the application referenced above. This memorandum is submitted in accordance with section 7 of the Endangered Species Act of 1973, as amended (87 Stat. 884; 16 U.S.C. 1531 *et seq.*) and the provisions of the Fish and Wildlife Coordination Act of 1958, as amended (48 Stat. 401; 16 U.S.C. 661 *et seq.*).

### PROJECT DESCRIPTION

The NPS proposes to implement the Biscayne National Park FMP. Implementation of the FMP is strictly for suppression activities related to wildfire response and Wildland Urban Interface fuels reduction. There are no prescribed burns proposed as part of the FMP implementation and all fuels reduction is limited to mowing the defensible space around all park buildings. Pile burning of mop-up and cleared defensible-space material is proposed as outlined in the EA for this project.

### THREATENED AND ENDANGERED SPECIES

The NPS has determined the project "may affect, but is not likely to adversely affect" the endangered West Indian manatee (*Trichechus manatus*), endangered Key Largo woodrat (*Neotoma floridana smalli*), endangered Key Largo cotton mouse (*Peromyscus gossypinus allapaticola*), threatened bald eagle (*Haliaeetus leucocephalus*), endangered wood stork (*Mycteria americana*), threatened piping plover (*Charadrius melodus*), American alligator (*Alligator mississippiensis*; similarity of appearance), endangered American crocodile (*Crocodylus acutus*), threatened eastern indigo snake (*Drymarchon corais couperi*), endangered green sea turtle (*Chelonia mydas* includes *aggassii*), endangered hawksbill sea turtle (*Eretmochelys imbricata*), endangered leatherback sea turtle (*Dermochelys coriacea*),



threatened loggerhead sea turtle (*Caretta caretta*), endangered Kemp's (= Atlantic) ridley sea turtle (*Lepidochelys kempii*), endangered Schaus swallowtail butterfly (*Heraclides* [= *Papilio*] *aristodemus ponceanus*), endangered beach jacquemontia (*Jacquemontia reclinata*), candidate Florida's semaphore cactus (*Opuntia corallicola*), and American crocodile and West Indian manatee critical habitats.

In its EA and FMP, the NPS fully considered the potential effects to listed species occurring within Miami-Dade County. The NPS refined the section 7 consultation, and avoidance and minimization measures, to those species known to occur within the action area. As fire and its related suppression activities are unpredictable, the NPS has evaluated the potential effects to, and requested concurrence with determinations for, all listed species occurring within Biscayne National Park boundaries.

To minimize potential adverse effects to species within this action area, the applicant has agreed to use existing roads whenever possible; hand-construct firelines; not use fireline explosives; avoid ground disturbance and minimize width and construction of firelines; use water instead of fire retardant; and minimize other collateral natural damage and disturbance resulting from containment and suppression of wildfire as further described in the EA and FMP.

In view of the applicant's agreement to implement these avoidance and minimization measures, the Service concurs with the NPS' "may affect, not likely to adversely affect" determination for the species referenced above.

Thank you for your cooperation and effort in protecting threatened and endangered species and fish and wildlife resources. If you have any questions please contact Mike Carlson at 772-562-3909, extension 296.

cc:  
NPS, Homestead, Florida (Linda Canzanelli)

bcc:Reading  
MCarlson:lak:8/12/04(R:\2004\August\08-30-04 memo format NPS Robin Toole concurrence.doc)

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May 4, 2004

Ms. Robin Toole  
Regional Fire Planner  
National Park Service  
Atlanta Federal Center, 1924 Building  
100 Alabama Street, S.W.  
Atlanta, GA 30303

Re: Biscayne National Park Draft  
Fire Management Plan,  
Dade County

Dear Ms. Toole:

The Office of Environmental Services of the Florida Fish and Wildlife Conservation Commission has reviewed the referenced draft management plan. As stated in the draft plan, Biscayne National Park does not contain any fire-maintained ecosystems, and we support the fire suppression tactics as outlined in the draft plan.

Sincerely,

A handwritten signature in black ink that reads "Brian Barnett".

Brian S. Barnett, Interim Director  
Office of Environmental Services

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cc: Mr. Kenneth D. Haddad, FWC  
Ms. Brenda Collins, FWC



FLORIDA DEPARTMENT OF STATE  
**Glenda E. Hood**  
Secretary of State  
DIVISION OF HISTORICAL RESOURCES

Ms. Robin Toole  
National Park Service  
Southeast Regional Office  
Atlanta Federal Center, 1924 Building  
100 Alabama Street, SW  
Atlanta, Georgia 30303

April 20, 2004

RE: DHR Project File Number: 2004-3145  
Received by DHR March 31, 2004  
Draft Fire Management Plan - Biscayne National Park  
Biscayne National Park, Dade County

Dear Ms. Toole:

Our office received and reviewed the above referenced project in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended and *36 CFR Part 800: Protection of Historic Properties*. The State Historic Preservation Officer is to advise Federal agencies as they identify historic properties (listed or eligible for listing, in the *National Register of Historic Places*), assess effects upon them, and consider alternatives to avoid or minimize adverse effects.

We specifically reviewed sections 3.4.1.9 and 10.1 dealing with Cultural and Historic Resources. Based on the information provided, it is the opinion of this office that the Draft Fire Management Plan has adequately identified and addressed cultural and historic resources.

If you have any questions concerning our comments, please contact Scott Edwards, Historic Preservationist, by electronic mail [sedwards@dos.state.fl.us](mailto:sedwards@dos.state.fl.us), or at 850-245-6333 or 800-847-7278.

Sincerely,

*Bartara C. Mattick*  
*DSHPO for Survey & Registration*

*for* Frederick Gaske, Acting Director, and  
Deputy State Historic Preservation Officer

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